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Mergers Do Not Insure Low Costs

Mere Size of Consolidation Will Not Bring Reduction
in Distribution Expense—Real Managerial
Ability Is Most Important Factor

BY B. C. MILNER, JR.*

IT is impossible for me to conceive of any question which is more difficult to answer than that which I have been asked to discuss—"Do Consolidations Result in Reduction of Distribution Expenses?"

Unquestionably this is the most important problem facing American business men today. Consolidations during the first 20 years of this century were almost invariably based upon effecting economies in production. To a very large extent the possibility of effecting major savings in the cost of goods has been eliminated by the work which has already been done. It goes without saying that further ways of decreasing costs of production are being and will be developed, and I sincerely trust that this process will never cease. However, it must be recognized that, speaking in general terms, further savings in the costs of production will be in terms of fractions of per cent, or in pennies per unit.

Again, speaking in general, we may say that the substantial profits of the past have been earned by the companies that first learned how to produce more cheaply than their competitors. The profits of the future will go to the companies who learn how to distribute with greatest economy.

At this point it might be well for me to state frankly that I do not believe any one man can give a comprehensive and conclusive answer. There are numerous consolidations, with which you are all familiar, which have been eminently successful.

Fortunately, or unfortunately, developments of the past 45 days have brought very forcibly to our attention the fact that we have numerous mergers and consolidations which have received very little publicity, and which are not, and probably never will be, really successful.

Within the past few weeks we have read and heard many explanations for the crash in security prices on the Stock Exchange of the United States. Somewhere among these I read an article, in which paper and by whom I have forgotten, to the general effect that part of our ills was due to the fact that many consolidations had been effected solely because there was a "finder's commission" to the promoter, and a handsome profit to the banker who floated the securities.

It is a very simple matter to take the balance sheets and

operating statements of two or more companies and to set down their figures in parallel columns. Working out estimates as to what might happen if these companies were consolidated has a distinct fascination. The process that is ordinarily followed includes an estimated increase in sales, an estimated saving in cost of sales, an estimated decrease in selling expenses and in administrative expenses, and consequently the estimated future operating profit is enormously increased.

Following the same process the balance sheet figures are totaled and then these totals changed to allow for amounts by which fixed investment can be decreased, inventories lowered, cash balances increased, fixed charges reduced, and so on.

In theory all of the estimates are correct, and the resultant figures are usually highly satisfactory from every angle. Theoretically, if two competing companies are consolidated, sales should increase. It would seem that eliminating the competition between two selling organizations and concentrating the efforts of those organizations under one executive should result in increasing sales both by obtaining a larger share of the existing business, and by increasing the market. Similarly, the consolidation of production facilities and the elimination of the least efficient plants should make it possible to decrease direct costs and to scale down overheads. In theory at least both sales and the administrative expenses should be decreased following a consolidation. Only one set of officers will be required, only one sales manager will be necessary, one production manager can be eliminated, and so on.

Again in theory, where two or more companies are merged it should be possible to carry on the combined businesses with less plant and machinery, with less inventory, with smaller fixed charges, and as a consequence of all of these things the net profits available for dividends should be tremendously increased.

No Way of Estimating Effect on Morale

It is very unfortunate that actual results obtained by consolidations do not always work out according to the estimates, and the fundamental reason for this is that no one has devised any method of estimating future results of the most important element in any consolidation—the human beings who are to be picked out of their separate organizations and thrown together, without their advice

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or consent, to work under circumstances which may or may not be pleasant, with new associates whom they may or may not like, and at tasks for which they may or may not be prepared.

Any of us can take two factories and place them under common ownership with full assurance that we will have so many square feet of floor space, so many machines and other facilities. Any one of us can take two bank balances and add them together with full assurance that the result will be a given number of dollars; but no formula has been devised whereby we can put together two presidents, or two sales managers, or two stenographers, or two workmen, with any assurance that the net result will be even one competent executive, or one aggressive merchandiser or one satisfactory secretary, or one efficient producer.

It is because of this essential human element that many consolidations fail to measure up to the estimates prepared by promoters. It is an unfortunate fact that most mergers which have been effected have entirely disregarded the persons who are to operate and manage the combination. The general feeling seems to be that if terms and conditions as to securities can be agreed upon, and the president of one company made chairman of the board, while the president of the other company becomes president of the consolidation, that no further thought need be given to the matter.

Few Mergers Really Successful

You are probably all familiar with the statistics regarding mergers prepared by Prof. Arthur Stone Dewing of Harvard University. Out of 35 major industrial consolidations effected between 1893 and 1902, in only three instances were the actual earnings for the first year equal to the estimated earnings; in only 13 cases were the earnings the first year for the consolidation equivalent to the earnings of the separate companies prior to the merger, and in only 14 cases were the earnings in the tenth year after consolidation equal to the earnings of the separate companies. It is my belief that if the same information were available on all mergers which have been effected in this country to date that very much the same situation would be revealed.

The engineering work of Ford, Bacon & Davis, Inc., has brought us into intimate relationship with numerous public utility and industrial consolidations during the past 35 years. Our work is of a type and character which makes it essential that we should procure an intimate knowledge of operations of these companies. This has enabled us to obtain a detailed cross-section of American business, which is not usually available. It might, therefore, be of interest to cite some of the specific situations which we have seen develop, or which we have been in position to watch in subsequent periods.

Merger of Motor Car Accessory Makers Fails

Company "A" was a medium-sized manufacturer of an integral part of automotive vehicles. The company had grown at an astonishing rate from a very small beginning and it reached a position of pre-eminence in its particular field. The president of the company was a man of unbounded energy, enthusiasm and a wonderful personality. He had started as an apprentice in a machine shop and his ability as an economical producer was unquestioned. He had, also, a special ability for picking, training and controlling production men. Merchandising, however, was a closed book as far as he was concerned and unfortunately he did not exercise the same keen discretion in choosing his sales organization as was so evident in the building of his production division.

The company continued to grow in spite of, rather than because of, its selling organization. A promoter suggested that the company absorb two other companies manufac-

Do Consolidations Result in Re

¶ My first generalization would be that consolidations are less likely to effect savings in distribution competitive but allied products salable to the same

¶ My second generalization would be that it is standard products which are generally used than to specialized products, such as machinery, equipment or tightly limited clientele.

¶ My third generalization will be a repetition of a most important factor—mere size of a consolidation dependence upon sheer mass is futile.

turing non-competing products, also applicable to the motor car industry. Based on past records and estimated future earnings the consolidation was readily financed. The important element in the estimated increased earnings to be effected by the consolidation was the sales of the products of the three companies by one group of salesmen and the elimination of two sets of sales executives, branch offices, billing clerks, collection departments, etc. Further substantial savings were to be effected by consolidating shipments from three plants in carload lots.

Dissension and Poor Sales Organization Bring Disaster

The three companies separately had earned in excess of two million dollars net in the year prior to the consolidation. Within three years after the consolidation, the company went into receivership. The cost of distributing the products of this consolidation actually showed an increase while the net sales showed a considerable decrease. As soon as the consolidation was effected, the general sales manager of the major company was given charge of all merchandising activities, with instructions that the best men in each organization were to be retained. Dissension developed immediately, accompanied by a feeling of uncertainty on the part of each member of the sales organization as to whether he was to be retained or discharged. Obviously very little effective sales work was done, for each man was primarily engaged in attempting to protect his own position and at the same time keep an eye out for other employment. By the time the final decision had been reached as to the eventual make-up of the consolidated selling force, it was ascertained that selling expenses had not been decreased to any material extent. Salary raises, based upon the assumed increase in responsibilities, had become rather general. In consolidating branch offices more expensive quarters were acquired, so that branch rents for the consolidation were almost equal to the rentals paid by the three separate companies; traveling and entertainment expenses showed an astonishing increase and calls per salesman decreased by over 50 per cent, the excuse being that each salesman now had to discuss three products and usually had to see three different men in each automobile plant with the consequent delays in going from one man to another or from one department to another. Numerous accounts were lost for each product, as the automobile manufacturers were absolutely unwilling to entrust to any one organization orders for three essential parts of their completed cars or trucks.

A Carefully Planned Merger Succeeds

Some years later, "B" company in an entirely differ-

duction of Distribution Expense?

tions of companies manufacturing competitive products than are consolidations of manufacturers of non-general market.

easier to effect savings in the cost of distributing effect savings in the cost of distributing more supplies which must be merchandised to a compar-

previous statement. Real managerial ability is the will not result in decreased cost of distribution. De-

ent field undertook a program of expansion. Careful consideration was given to all conditions prevailing in the particular industry in which this company was engaged and the decision was reached that expansion by consolidation should be effected, but that such consolidation should be with non-competing companies manufacturing products salable in the same general market. The first step was a major merger, carefully worked out, not only with the stockholders of the respective companies but with the operating personnel including the minor executives and department heads.

No attempt was made to eliminate any existing selling expense other than the duplication of branch offices. Branches were opened in numerous cities which neither of the separate companies had been able to afford. Therefore, where offices were consolidated one manager and some of the other employees were moved to new cities, retaining both titles and salaries. The sales staff was not only maintained but was increased by the addition of salesmen to cover the newly opened territories; each salesman continuing to concentrate on the product with which he was best acquainted, but, of course, boosting all the products of his company, and exchanging information with his fellow salesmen as to prospective customers for the allied line.

After an 18-month interval, spent in working out the consolidation of the two organizations, building a real esprit de corps, a third company, manufacturing a different line of products, was brought into the consolidation and similar methods were followed. A year later a fourth company was added. The net result has been an actual increase in sales of approximately 33 per cent over the sales of the separate companies, a decrease of administration expenses equal to 3 per cent of net sales, a decrease in selling expense of approximately 4 per cent and an increase in net profits of almost 250 per cent. Everyone concerned had benefited, the consumer by receiving improved products and better service at lower prices, the employees by increased earnings and steadier work, and the stockholders by increased dividends.

In this particular case the answer to our question would obviously be an enthusiastic affirmative.

Ignoring Personnel Proves Bad Policy

The results of the foregoing case were so entirely favorable that a promoter was able to interest a group of bankers in financing an even larger merger in the same industry, and the operation was carried out, not step by step, but simultaneously. Ten companies were merged at one time.

The first word that the employees of any of these com-

panies had was the appearance in their local paper of an Associated Press dispatch from New York that the consolidation had been effected. The resulting confusion is almost indescribable. For, after all, 10 presidents, 32 vice-presidents, 10 secretaries, 10 treasurers, 10 sales managers and an unknown number of assistant sales managers, branch managers, factory superintendents and salesmen are a difficult group to handle, particularly when they are both astonished and displeased at what has been done by their superiors, and when they are pessimistic as to the workability of the consolidation.

In the first year after consolidation net sales were 40 per cent less than the separate companies had attained during the prior year, the substantial net profits of the individual companies had disappeared and were replaced by an operating loss. The total cost of distribution was decreased by the consolidation but the cost per unit was decidedly increased.

A Case of Sharply Reduced Merchandising Costs

Some years ago two manufacturers of a standard commodity decided to merge. Each company had a moderately successful record. Some refinancing was necessary and the bankers who were approached were frankly skeptical. However, they finally agreed to underwrite the securities after it was pointed out to them that the consolidated companies would probably have sufficient volume of business to eliminate the middleman completely, and to conduct its merchandising direct to the consumer by a selling organization completely controlled by the new corporation.

After the initial difficulties, always encountered in changing from one form of selling to another, the actual operating results attained considerably exceeded the prior estimates. The actual cost of distributing the merchandise through its own sales force proved to be almost 12 per cent less than the discounts and the commissions previously granted the middleman, and the sales of the consolidation were considerably expanded into new fields which the middleman had not discovered. In this case the decrease in the cost of distribution was very material.

A Merger Brings Startling Decrease in Sales

The fact that methods which are successful in one industry, or in one line of commodities, cannot be universally applied may best be illustrated by another merger which was effected simultaneously with the above. A group of companies manufacturing equipment for one of our major industries was consolidated. While each product of the consolidation had a distinct place in the industry, nevertheless each article had to be sold on its merits for the particular purpose then under consideration, and in competition with the products of several other manufacturers. The original purpose of the promoters was the elimination of duplication in salesmen and dealers, the theory being that one salesman could cover the territory previously requiring several men, and that all dealers could be eliminated and the territory which they had served could be covered by a few salesmen at less expense than the commission previously paid.

The immediate results were a startling decrease in sales, and it was not until the bankers stepped in and forced a complete change in management policies that the position was rectified. The improvement did not come through a decrease in distribution expense. Rather, expenses were brought back to the level existing prior to the consolidation. It was found, however, that the larger operation permitted the development of a group of salesmen whose sole purpose was the maintenance of intimate contact with all prospects in their territory. When these men, with their personal acquaintances, were reinforced by specialists whom they could call in to handle particular transactions, they were able to increase sales over any prior records. The enlarged operation warranted the in-

stallation of warehouses at all large centers. Therefore deliveries, an important consideration, could be made, which none of the competitors, compelled to ship from their factories, could possibly meet. Many other benefits of the consolidation developed as time elapsed. The merger today is considered one of our most stable and profitable industries.

Dictatorial Policies Invite Retaliation

Some years ago a merger was effected between several companies manufacturing products of general public use. The participants, the promoters and the bankers cited numerous benefits to be derived from the consolidation, prominent among them being the benefits to be derived both by the company and by the consumer from the decreased cost of distributing the several lines of products. It was pointed out that the consolidation would be the only company in a position to quote on a complete line, that both the wholesaler and the retailer could be almost compelled to carry the full line of products, and that the company would be in position to dictate as to this. It was further pointed out that the company would be in a position to undersell any of its existing competitors, should that become necessary. We were recently requested by a group of bankers to undertake a study of the situation of this company, the question asked of us being, "Shall we supply additional capital to this corporation or shall it be placed in liquidation?"

It developed that the promoters and executives of the original consolidation had not counted the human element in any of their plans. Wholesalers and retailers refused to be coerced. The dictatorial policies originally adopted were keenly resented and at the first possible opportunity retaliatory measures were instigated. Internal friction developed to such an extent that cost of production increased to a point where sales could not be effected at profitable levels. The competitors were quick to take advantage of the situation, first, by hiring away the best men of the organization who had become discouraged over the disagreeable conditions which had developed, second, by increasing their efforts to take care of the business of the wholesalers and retailers previously dependent upon

the consolidation, third, by the formation of an association which would effectively eliminate competition between the small companies and direct it almost exclusively against the large company.

Brain Power Is Governing Factor

Instances of this character might be multiplied extensively. I believe, however, that you will have gathered the inference that insofar as our experience goes there is no possibility of answering our question in either the affirmative or the negative. Some consolidations do decrease the cost of distribution, other consolidations increase cost of distribution. Policies and personnel, in other words, brain power seems the governing factor.

There is such a thing, of course, as foolish economy, i.e., an effort to reduce distribution expenses on the basis that merely by such reduction some benefits are received. More often than not the effort should not be to reduce the number of dollars spent but to see that each dollar is spent more effectively and produces a greater volume of business. In this case the reduction of expense is relative rather than actual. In other words the cost of doing business becomes a lesser percentage of the sales dollar.

Good Management Is Imperative

Based upon our own observations we would say that in general the answer to the question depends, to the largest degree, upon the management. We have seen good management handle very difficult situations so skillfully that distribution and other costs were decreased. Likewise, we have seen poor management make a complete botch of operations which were inherently simple and held every promise of success. If a direct answer to the question is necessary, I must resort to generalizations, injecting a warning, however, that there are sufficient exceptions to these generalizations to furnish the basis of endless arguments. [For these concluding statements see p. 1576.]

If I must answer the question "Do consolidations result in reduction of distribution expense," then I must fall back on a precedent established by the Scotch and reply, "Not necessarily."

Arc-Welded Pipe Joints Are 75 Per Cent Efficient

INFORMATION concerning the 624-mile oil line from Cushing, Okla., to refineries near Chicago, has been issued by Lincoln Electric Co., manufacturers of the



welding equipment used for making the field joints. Work started last winter, and was continued throughout cold and wet seasons; average production per welder was 10.3 welds per day, although in good weather the best men reached a figure of 25 joints per day.

Pipe was 12-in., electrically welded, with bell and spigot joints on each 40-ft. length. Ninety-one welding generators, driven by gas engines, mounted on wagon beds and drawn by team or tractor, were required. Each weld was completed in two beads. Hydrostatic tests at 800 lb. per sq. in. completed on 354 miles of this line revealed pin-hole leaks in only three of the 47,000 joints. Workmanship was under periodic test and close inspection; a number of joints were cut bodily from the line and pulled apart with the following results:

Test Number	Tensile Strength in Tons		Efficiency of Welded Joint, Per Cent
	Pipe	Welded Joint	
1	386.05	310	80.30
2	431.86	325	75.95
3	419.21	278	66.31
4	346.98	278	80.12
5	349.74	318	90.92
6	366.05	320	87.42
7	441.58	285	64.54
8	413.21	252	60.97
9	428.07	275	64.24
10	342.88	324	94.49
Average	392.57	296.50	75.52

Cleveland Opens Foundry School

Equipment for Training Apprentices Includes a \$50,000

Foundry and \$15,000 Worth of Machinery

Donated by Manufacturers

A TRADE school for foundry training in Cleveland was formally dedicated at a dinner meeting held Dec. 6 in the molding room of the school by Cleveland foundrymen comprising the foundry group of the American Plan Association of that city. Those in attendance also included representatives of the Cleveland Board of Education, members of the manufacturers' committee on industrial training of the Cleveland Chamber of Commerce, foundry equipment manufacturers and the foundry school apprentice boys.

Walter L. Seelbach, president, Forest City-Walworth Run Foundry Co., Cleveland, and of the Gray Iron Institute and chairman of the Foundry Group of the American Plan Association of Cleveland, acted as toastmaster and formally presented the foundry equipment to the Cleveland Board of Education. The principal speaker was Harold S. Falk, vice-president and works manager, Falk Corporation, Milwaukee, who has long been active in promoting apprenticeship training in Milwaukee and as a member of committees of the National Metal Trades Association and of the American Society of Mechanical Engineers. Another speaker was William Frew Long, general manager of the American Plan Association of Cleveland, who reviewed the history of the school.

The school was founded and is being conducted by the

cooperative efforts of the Cleveland foundrymen and the Cleveland Board of Education and combines school work with apprentice employment in foundries. It was started at the opening of the school year in September with an enrollment of 28 boys and marks a new step in vocational training in Cleveland.

The aim of the school is to give the boys a thorough training, both technical and practical, in the fundamentals of the foundry trade. The training will include melting and molding of gray iron and non-ferrous metals, brass and aluminum, core making and pattern making. The prime purpose is to train boys by cooperative methods to become skilled molders and core makers for the foundry industry of Cleveland through the combined efforts of the foundrymen and the public schools. With this training it is believed that many of the boys taking the foundry course will be capable of becoming foremen and plant executives.

Foundry Erected Last Summer

The foundries sponsoring the school compose the foundry group of the American Plan Association of Cleveland, which is cooperating with the Department of Vocational Training of the Cleveland Board of Education. A \$50,000 foundry for the school was erected during the summer by the school board and the greater part of the equipment



Foundry for Training Apprentices Is Completely Equipped With Standard Type Machinery Used in Regular Production Work. Cupola is in background

was provided by funds contributed by Cleveland foundries and by donations of \$15,000 worth of equipment by equipment manufacturers.

Several leading foundrymen of Cleveland cooperated in working out plans for the foundry, which is well arranged for practical operation and which occupies a comparatively limited amount of floor space without the appearance of crowding. While it might be called a miniature foundry, nevertheless it is completely equipped with standard type machinery used in regular production work.

The melting and molding department occupies a well-lighted room 30 x 60 ft., with a high ceiling. At one end is a 2-ton 41-in. Whiting cupola lined down to 27 in. The cupola is tapped into a 1-ton geared mixing ladle. The blower is located on the floor at the side of the cupola. The foundry is served by a traveling crane equipped with a 2-ton electric hoist.

Charging Floor Built in Form of Balcony

At the side of the cupola are two furnaces for melting brass and aluminum. The charging floor is built in the form of a balcony at the end of the foundry. This extends around one side of the room, where space is provided for the storage of patterns, flasks and other material. A raised driveway runs along the cupola end of the building, permitting pig iron, coke and limestone to be discharged from trucks onto the charging room floor. Beneath the driveway are sand storage bins, which open directly back of the cupola. Six molding machines of different types are placed along one side of the foundry.

Separate rooms are provided for the core making, cleaning and pattern making departments. The core room has two core making machines and a drawer type baking oven. The cleaning department equipment includes a sand blast cabinet, a sand blast mill, a 24 x 36-in. tumbling mill and a dust arrestor, all supplied by the W. W. Sly Mfg. Co., as well as a Bridgeport double wheel grinder. Seventeen benches are provided in the pattern making room, which is unusually well lighted through a glass skylight.

The school has a four-year apprenticeship course and admits boys who have completed the eighth grade in the public schools. Boys are spending full time in the school during the first year of their training. Half of this time is being spent in actual foundry work, in molding, core making, melting and mixing, pattern making and cleaning in the school shop. One-third of the time is occupied in such studies as mathematics, foundry technology and mechanical drawing as related to foundry operations. The remaining one-sixth of the time is devoted to such academic subjects as history, English, civics and hygiene.

Students Spend Half of Second Year in Foundries

During the second year the students will spend half time in the school and half time as apprentices in Cleveland foundries, receiving the wages of an apprentice for the time actually employed in the foundry. During the third and fourth years they will be employed in Cleveland foundries as apprentices at full time pay, but will return to the school for a half day each week for special instruction. They will receive their regular wages from their employers for the half day spent each week in school work. Apprentices already employed in Cleveland foundries will be admitted to the school for a half day each week with no tuition charge.

In addition to training apprentices, the school will give special instruction to molders and foundry foremen as soon as facilities can be provided. The school is in charge of James Goldie as chief instructor. Mr. Goldie equipped and operated the foundry division of the Meriden State Trade School at Meriden, Conn., and had previously received a practical training in the foundry industry.

Interest in the foundry school among prospective pupils

was created by the distribution of an illustrated booklet in which the plan of the school was outlined and the opportunities for boys in the foundry industry were pointed out. It called attention to the changes that have occurred in the foundry industry on account of the invention of labor saving machinery and the increasing recognition of the need for scientific training and skill which have brought about new standards in this basic industry and which have marked the passing of the day when brawn and muscle were considered the prime essentials for foundry apprentices. This publicity was supplemented by advertisements inserted in the foreign language newspapers in Cleveland before the opening of the school with a view toward attracting students.

Advisory Committee Helped Prepare Course

An advisory committee of foundrymen was appointed to work with representatives of the Board of Education and the chief instructor in preparing the course of instruction and working out other details in connection with the school's operation. This committee serves as a liaison committee between the foundries and the school. It is composed of D. P. Lansdowne, West Steel Casting Co., chairman; Daniel Gluntz, Gluntz Brass Foundry; F. J. Grondie, Kilby Mfg. Co.; and A. B. Norton, United States Aluminum Co. Representing the Board of Education are H. L. Briggs, director of vocational education, and John Fintz, coordinator. In addition, there is a foundry apprenticeship training committee consisting of William H. Shilling, the Atlas Foundry Co., chairman; R. H. West, West Steel Casting Co.; Tracy Calhoun, Johnston & Jennings Co.; George Hammink, Wellman Bronze Co.; W. J. Strangward, Forest City-Walworth Run Foundries Co.; and Messrs. Grondie, Gluntz and Norton.

Mr. Strangward was chairman of the committee on equipment. Among manufacturers who donated equipment were the Aluminum Foundry Equipment Co., Chisholm-Moore Hoist Corporation, Federal Foundry Supply Co., Foundry Equipment Co., Osborn Mfg. Co., Johnston & Jennings Co., Reliance Electric & Engineering Co., W. W. Sly Mfg. Co., Standard Sand & Machine Co., Standard Pattern Works Co., Sterling Wheelbarrow Co., E. J. Woodison Co., Smith Facing & Supply Co., and Werner G. Smith Co.

An Undersupply of Production Foremen

INVESTIGATIONS conducted by the Society for the Promotion of Engineering Education indicate that the manufacturing industries of the country could absorb yearly about 11,000 graduates of four-year college courses in engineering. To supply this need, and the additional needs of the mining and transportation industries as well, only about 9000 men are graduated each year.

However, a tremendously greater need is felt for men with 2 years of post high-school training—graduates of so-called technical institutes. Such men gravitate toward the production departments in supervisory capacities. Nearly 600,000 such positions exist and only about 10,000 of them are filled by graduates of technical institutes. To supply the replacements needed, 30,000 men should be graduated every year, yet at the present time probably not more than 2000 are being turned out annually by such schools as Pratt and Rochester Mechanics Institutes.

The conclusion, as stated by W. E. Wickenden, investigator for the society, before the meeting of the American Society of Mechanical Engineers last week, is that the numbers of schools offering this "truncated engineering course" should be greatly expanded. They would draw from a couple of million young men who are not fitted for full college work, or who cannot afford it, and would not compete with established institutions for students.

Burns Vitreous Enamel Electrically

Large Continuous Conveyor Furnace Used in Plant of
Republic Stamping & Enameling Co.

A CONTINUOUS conveyor type electric furnace for burning in vitreous enamel on kitchen ware was recently placed in operation by the Republic Stamping & Enameling Co., Canton, Ohio. It is a 450-kw., 220-volt, 3-phase furnace of a new type developed by the General Electric Co. and briefly described in THE IRON AGE, Jan. 24, 1929. Several of the furnaces are being used by that company in enameling parts used in the manufacture of electric refrigerators and other products. Not only has the furnace a large capacity, but the quality of the work is said to be much improved because of the close temperature control and the absence of smoke and gases.

The furnace is of the closed end type, the work entering and leaving at the same end. The heating units are located in the closed end, which is U shaped, and in it the conveyor makes a loop. The furnace is 83½ ft. long

and includes a preheating section approximately 68 ft. long. The first 40 ft. of this section is on a horizontal plane and can be used as a drying zone. The next 28 ft. is an inclined section, the incline being of such a degree that the bottom of the heating or firing chamber is slightly higher than the top of the drying section, so that the heated air is largely confined in the heating chamber. Each side of the firing chamber is 13 ft. long and the U bend is approximately 7½ ft. in length making a total travel in the firing chamber of 33½ ft.

The heating units, which are of nickel-chrome ribbons, are mounted on the side walls of the U and on each side of a center wall which extends partly through the heating chamber. There are three separate temperature control zones, one on the incoming side of the U and two on the outgoing sides, one of the latter being at the top and the other at the bottom in order to keep the temperature uniform at the top and bottom of these two zones. Temperature in the three zones is automatically controlled by Leeds & Northrup instruments including a chart recorder and the temperature is held within a range of 10 deg. Current for the furnace is supplied by a com-

mercial company at 4000 volts, 3-phase, 60-cycle and this is stepped down by transformers to 220 volts.

Work is set on specially designed racks suspended from the conveyor chain on 36-in. centers. The racks, 28 in. long and 28 in. deep, have three adjustable shelves. Each rack will hold 12 moderately sized pieces. The

work is set on pins or bucks which are parts of the rack members. The conveyor was built by the Palmer-Bee Co.

The conveyor has a speed range of from 3 to 18 ft. per min. However, the company is operating it at a uniform speed of 12 ft. per min. for burning the three coats, the temperature being reduced for the second and third coats. The ground coat is burned on at a temperature usually ranging from 1680 to 1700 deg. Fahr., the maximum being 1740 deg. and the second and third coats at 1500 to 1560 deg. If the quantity of ware

on the conveyor is larger than in usual operations or heavy pieces of ware are being burned, the temperature may be raised or the conveyor run at a slower speed. In normal operations the work is kept in the heating zone 3 min.

While the first or entering zone is intended as a drying zone for drying the enamel after dipping and before burning, thus utilizing the heat that passes from the burning zone, lack of space did not permit the construction of a conveyor of sufficient length for the loading of the wet ware on the conveyor racks. Consequently, drying before burning is done in steam-heated ovens from which the work after cleaning and beading goes to the baking oven.

An output of 30,000 to 34,000 pieces of enamel kitchen ware, or 15 to 17 tons in a day's run of 23 hr., is being obtained with the present furnace operation, but it is stated that were the furnace operated at its maximum capacity this output could be about doubled.

While electric furnaces have been used in this industry for some time, this is the first one of the continuous type used for burning vitreous enamel on kitchenware.



Continuous Type Electric Furnace Is Used for Burning Vitreous Enamel on Kitchenware

Economy from Use of Pressed Steel

Lower Costs and Handier Operation Follow Redesign of Motor Case and Other Parts of Portable Electric Drill

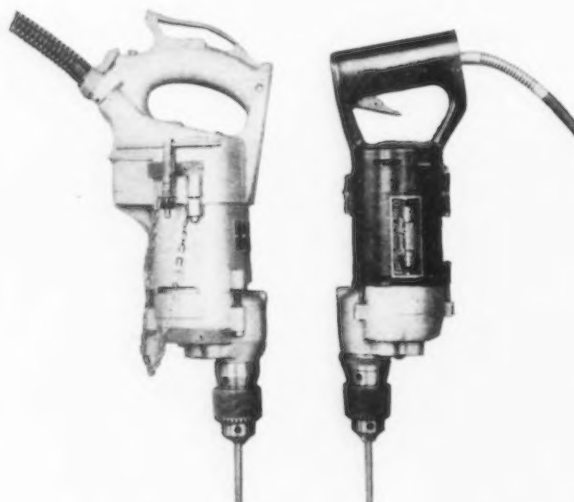
BY ROGERS A. FISKE*

REDESIGN to permit use of pressed steel motor cases and other parts of several models of portable electric drills produced by the Speed Way Mfg. Co., Cicero, Ill., has resulted in reductions of one-third to one-half in cost of labor and material. The steel case is smaller in outside diameter than the aluminum castings formerly used, and so is the gear case and other parts that fit to the ends of the motor case. On some models the end bell and handle are now made of pressed steel. The smaller outside dimensions of the steel case and the accompanying decrease in weight contribute to the handiness of these portable tools, without sacrifice of serviceability. On one model the diameter was reduced $\frac{1}{4}$ in. and the weight cut from 11 $\frac{1}{2}$ lb. to 9 lb.

These drills are broadly classified as standard and heavy-duty types. On the smaller sizes, that is, up to $\frac{5}{16}$ in., the motor case and end bell are in one piece, which consists of a drawn steel shell, $\frac{3}{4}$ in. outside diameter and $\frac{4}{8}$ in. deep, made from either No. 20 or No. 22-gage sheets. On larger tools the motor case and end bell are separate pieces cut from standard deep-drawn metal shells of the dimensions given. Tools of various sizes take the same diameter case but the length of the case varies. For some sizes of tools two of the standard shells are used, one from which the stator case is cut and one from which the head or end bell is cut.

The question immediately is raised whether this practice may not be wasteful, because two parts of two cases are discarded in order to assemble one motor shell with an end bell. However, close study of the problem has shown this manufacturer that the practice is sound from the viewpoint of cost. This is because the die cost would run up for the several sets of dies for cases of different

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The Drill With Drawn Steel Motor Case (at right) Weighs 9 Lb. or 2 $\frac{1}{2}$ Lb. Less Than the Former Type (shown at left).

dimensions, and there is a further advantage in price in ordering large quantities of one size case rather than small lots of different sizes. Also shop operations are simplified because there is only one set-up with the use of a standardized shell.

Weight of the working parts of the tools are the same regardless of the type of shell or case used. As previously pointed out, the saving in weight comes from the use of pressed metal and also from the reduction in diameter of parts, such as the gear case, which fit to the ends of the shell. On one model the aluminum case weighs 2 lb. 13 oz. and the steel case weighs 1 lb. 4 oz. About $\frac{3}{8}$ lb. is saved by the reduction of

$\frac{1}{4}$ in. in the diameter of the gear case casting.

Handles and Other Parts Also of Welded Steel

Drill handles also are made of pressed steel. Each handle is formed of two parts which are welded together and the seam ground to give a smooth surface. End bearing yokes, lugs for attaching the motor stator, lugs for attaching end bell to the motor case and this case to the gear case are all spot welded in place. The handle is spot welded to the end bell or the case, depending on the construction of the tool, and motor end bearings are welded to yokes, or, as in the case of the small tools, to the inside of the case head. Screws are used to assemble the end bell, motor case and the gear case. Drilled and tapped lugs on the gear case match with pressed metal lugs which are spot welded to the motor case. If the end bell is separate from the case tie screws with nuts hold the two parts in place by being passed through spot welded pressed steel lugs.

When both the shell and end bell were castings the following set-ups were required: four screw machine, five milling machine and three drill press; also two tapping



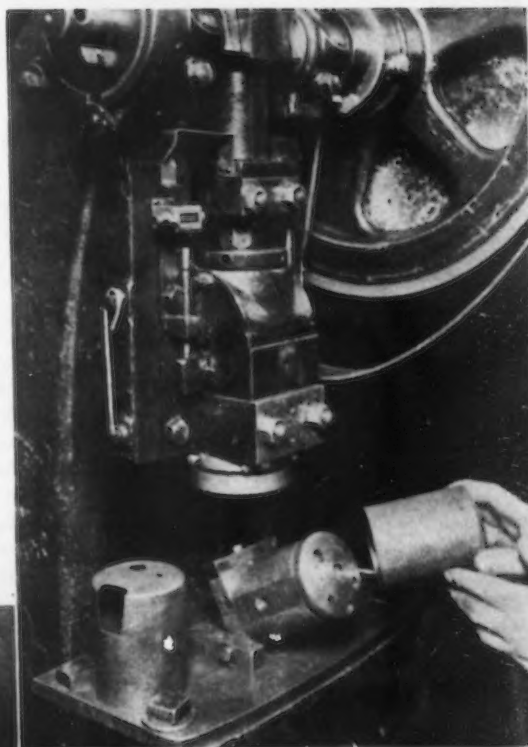
All Attachments, Such as Handles, Junction or Switch Boxes, Bearing Brackets and Screw Lugs, Are of Pressed Steel and Are Spot Welded to the Motor Case

operations. The use of pressed metal calls for eight punch press, three spot welding and two screw machine operations. Equipment previously used was a screw machine, a miller, and an eight-spindle gang drill press. There are now in use a spot welder, a No. 2 punch press and a screw machine.

Press and Welding Operations Simple

An idea of the simplicity of punch press and welding operations may be had by reviewing the methods used in making the motor case for a small electric drill. The cases are purchased trimmed to size, and for this size of tool the head and the barrel are not cut apart. The first press operation is punching the holes in the end and, in some cases, a slot which in a subsequent operation is extended to the side of the shell. The lower die for this operation is hinged so that it may be tipped forward as illustrated to receive the steel shell. The die is then tipped back so that its axis is vertical and in line with the center of the punch head. A latch holds the die block to the punch press plate. To remove the finished part the operator releases the latch, tips the die forward and lifts off the shell.

Ventilator slots in the side of the shell are cut in another punch press operation on a cantilever type die block. Two pins inserted in the head of the die serve to properly locate the shell on the die. When the shell is properly seated these pins project through two of the holes which were cut in the end of the shell in the operation already described. The cantilever part of the die is free to rotate. A pin, which is pressed into place by a spring, drops into notches cut in the movable part of the die, thereby serving as a feeler so that after one pair of slots has been cut the operator rotates the die block until he feels the pin drop in the next notch; he then knows the shell is in the right position for cutting the



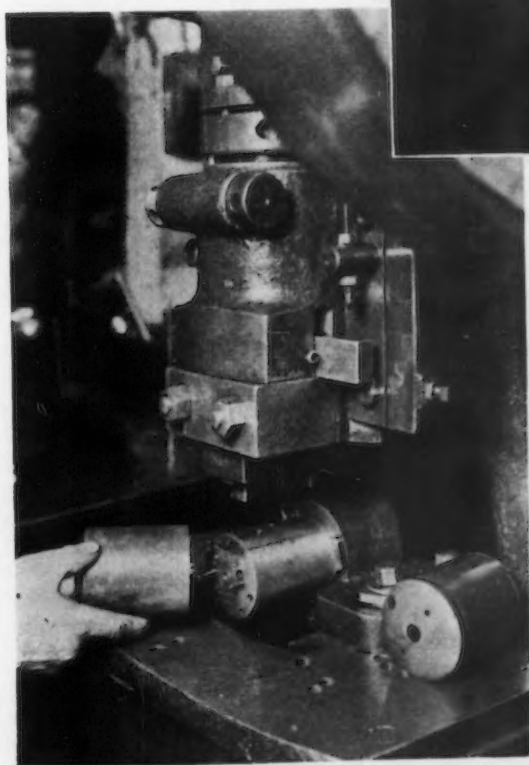
HOLES and Slots Are Punched In the Motor Case Head On a Die Which Tips Forward to Receive the Blank, as Shown Above. The punched holes are used as guides in locating the piece for the second punch-press operation, shown at the lower left. A simple jig (at the left) serves for locating the pressed metal screw lugs which are spot welded to the motor case

next pair of ventilator slots.

All parts that are spot welded are securely held in jigs to assure interchangeability and accuracy. Screw lugs are made of pressed steel and like other assembled steel parts are electrically spot welded in place.

The jig for spotting lugs on the shell consists of a flanged collar. The collar is turned so that it fits snugly into the end of the pressed steel motor shell with the flange resting against the end of the shell. Pins mounted in the flange extend along the outside of the shell, as illustrated. The diameter of each pin up to the point where a lug is to be fitted is larger than the opening in the lug. At the exact location of the lug the pin is turned down so the lug will snap over it. The shoulder formed by turning the pin forms a gage for the location of the lug. The pins are of various lengths so that all the lugs at the base and at the top of the shell are properly located before spot welding. After welding, the pressed metal parts are cleaned and lacquered.

"The greatest problem in production is that most uncertain factor, human nature," said Prof. Earle Buckingham, Massachusetts Institute of Technology, in a paper on Quality Control and Production Gages, presented at last week's meeting of mechanical engineers. "The present tendency is to provide equipment that can be operated by semi-skilled labor. Equipment cannot be made altogether fool-proof. The best that can be done is to arrange matters so that little or no excuse remains for making mistakes."



Economic Production Quantities

Utilizing Mathematical Formulas to Determine Lot Sizes in Manufacturing—Simplified Forms Believed Adequate

THREE papers were read before the American Society of Mechanical Engineers on Dec. 5, at the annual meeting in New York, dealing with determination of the economically best production quantity for manufacturing. One of these papers, by C. H. Best, supervisor of materials, Eli Lilly & Co., Indianapolis, dealt with 12 years' experience with the use of a formula for this work. A paper by Robert W. Kent, vice-president, Bigelow, Kent, Willard & Co., Boston, referred to obstacles encountered in introducing mathematical formulas for economic manufacturing quantities. A considerably longer paper by Fairfield E. Raymond, assistant professor of industrial research, Massachusetts Institute of Technology, Cambridge, was entitled "Advantages Derived from the Simplification of the Fundamental Formulas for Economic Production Quantities."

Experience Shows Value of Method

FOR twelve years economic production quantities have governed the sizes of production orders in the plant of Eli Lilly & Co. Mr. Best's paper outlines briefly some of the major results of this practice, both direct and indirect, and discusses some of the cost-accruing problems which were encountered in the derivation of the formulas. The discussion of cost-accounting problems is limited to such problems as might be generally encountered in other plants.

The company manufactures and ships from stock approximately 2400 products, which are marketed in over 8500 different packages. The problem is to maintain stocks of these 8500 items at the lowest possible combined cost of labor of preparation and charges for carrying the merchandise until sold. It was recognized long before 1917 that the quantity produced in a single batch was one of the important factors in determining the cost of producing and carrying the merchandise.

Data were assembled and eventually a mathematical formula was derived for "total cost," as follows:

$$N = 262.8 \sqrt{\frac{Y}{M + 202}}$$

where N = economic production quantity in units
 Y = number of units sold yearly, and
 M = cost of material in cents per unit.

The solution is an easy slide-rule calculation.

During 1917 the production of the plant was handled in 25,633, batches with a labor force of 554. Since 1917 the annual output has very materially increased. In 1928 the increased output was handled in 13,453 batches with a labor force of 482.

Inventory Reduced Considerably

During the past five years the inventory of raw materials has been reduced 21½ per cent by taking advantage of conditions brought about by larger and less frequent batches or runs of staple products. Larger and less frequent batches of staple products suggested scheduling the production of these items in advance, so that raw-material purchases could be scheduled to arrive just in time to meet

the production schedules. The average inventory of raw materials in 1928 was \$185,000 less than it would have been at the same rate of turnover as was experienced in 1923.

To sum up, economic production quantities have afforded, or have assisted in affording, the following advantages:

1. Considerably more production with 13,453 batches in 1928 than with 25,633 batches in 1917.
2. Considerably more production with a labor force of 482 in 1928 than with one of 554 in 1917.
3. Planning-Department supervision of production at reasonable cost (23 persons, who do certain other work also).
4. Increase in application of mechanical handling of materials.
5. Reduction of 21½ per cent in raw-material inventory.
6. An increase in turnover of finished-stock account from three and two-thirds times a year to four and one-third times.

Executive Must Be Educated

FOR the sake of establishing better manufacturing procedure, Mr. Kent points out methods for determining how much to manufacture of a particular item or part at one time or in one lot. He discusses what is meant by economic manufacturing quantities, the aid toward increasing profits that comes from use of proper formulas, and states that minimum economic manufacturing cost can be obtained only through application of the principles made use of in developing a proper formula to fit each specific case.

Formulas are available which will prove valuable if used. It is true that attempts to understand them may prove discouraging unless one is either very patient or of rather above-average mathematical cleverness. Successful and practical manufacturing executives do not usually develop the nimbleness in transposing concrete facts and experience into abstract formulas necessary to digest rapidly and "become sold on" the practicability of using x 's, y 's and k 's to tell them how much should be manufactured at one time.

A successful manufacturer is usually apt to fear anything which savors of mystery or magic. Furthermore, anything not readily subject to proof, or anything involving complications of any kind, is apt to hide errors, and factory procedure, to be successful, needs to be as fool-proof as possible. Obscurity of any kind reduces fool-proofness.

Return Must Be Far Above 6 Per Cent

It is possible that there has not been sufficiently appreciated the extent to which return on capital invested in industry should exceed the return on investment in sound, negotiable securities. It is common for members of the producing phases of industry to think more or less of 6 per cent as a definite interest rate to be used in all calculations they make. But it is probable that return on investment in inventories, equipment, etc., used in industry

It developed that a very real cause of the necessity for halving or quartering manufacturing quantities as calculated through the use of formulas, in the author's early experience with them, was that too low an interest rate on investment and inventory had been used. The modern economist, as well as the investment banker, in analyzing and diagnosing business situations, more or less accepts as standard the necessity for earning returns in excess of 9 per cent. The risks brought out through the possibility of changes and fluctuations in material prices, obsolescence due to new developments, credit stringencies, or business

Values of Unit Cost (Dollars per Piece)

ULTIMATE Unit Cost Curve, Based on Many Factors. The lowest figure is, in practice, obtainable for a certain distance either above or below the calculated quantity

Values of Quantity, Q

Labels on the graph include: L , $\frac{F}{Q_e}$, $Q \cdot r'$, Q_m , Q_e , Q_N , $(L+O)$, C , (M) , U_p , U_u , and $\sqrt{\frac{F + Q_e r'}{Q_e}}$.

Cost of Preparing to Process

Lots of 1000 units frequently will be found to have been used for manufacturing quantities, for no specific reason. Quantities which will keep factory workers busily employed for one day, or one pay period, seem to be in vogue. Quantities which will constitute a truckload or a trayload also seem to prevail as standards employed in determining size of manufacturing lots. All of these, of course, seem ridiculous in that they present no consideration of the real cost involved nor the effect on cost of difference in the size of lots.

cies were advantageously changed as a result of making use of economic manufacturing quantities.

PROFESSOR RAYMOND'S paper seeks to demonstrate that a rapid and reliable method can be developed for application to the problems most frequently encountered in planning production schedules and controlling inventories. This method is stated to be more simple than the fundamental formula developed in the author's 1927 paper on "Economic Production Quantities." Other advantages are gained from the simplified method.

Limits of the usefulness of the method are explored and a curve shown, herewith reproduced, for a graphical means of solution. No attempt will be made here to explain the various factors covered in the curve. Suffice it to say that the heavy line traces, for varying quantities, the respective unit costs under a certain set of conditions. The lowest is that at Q_c .

BALANCING up between direct labor cost in production and the preparation or setting-up cost before production begins was stated by Gordon Pennington, consulting industrial engineer, Cleveland, to be the criterion in determining economic production quantities. When there is a change in the ratio between these two items it is necessary to change the formula or to refigure, in determining upon a proper quantity to make of any one lot. When the preparation or set-up cost increases with relation to the direct labor cost, larger batches will be called for.

$$L = \sqrt{\frac{2 A D}{K B}}$$

Usually K falls between 0.12 and 0.36. The results from using this equation were said to have as great accuracy as is inherent in any cost accounting system now in general use. As a matter of fact, a difference of as much as 15 per cent in the size of the lot quantity may affect the total unit cost by not over 0.1 per cent.

$$L = \sqrt{\frac{A^2}{B^2} + \frac{AD}{KB} \left(\frac{NP}{NP-D} \right) - \frac{A}{B}}$$

It is important to establish a reorder point somewhere between the inventory excess and emergency shop orders needed to make up deficiencies. Either of these extremes would result in added costs.

The Iron Age, December 12, 1929—1585

T. Kent, director of sales and engineering, Divine Brothers Co., Utica, N. Y. He cited a case where, in the same plant, one department was so short of orders that it was difficult to keep a nucleus of the working force busy, while another department at the same time was hard put to it to get out the product, in spite of operating night and day crews.

In such a case it frequently becomes necessary to disregard economic production quantities for both departments. For the one, as it is necessary to keep the organization together if one is to avoid undue expense later in assembling a new organization, production lots will have

to be much smaller than the theory would point out as desirable. In the other case, demand for prompt shipment may require the same thing—that is, small production lots, to keep from turning customers away to competitors, even though the theory would call for much larger lots.

At the same time, when conditions permit, as when shipments are asked for by telegraph, the lots could be very much larger than called for by the equation, because then the element of inventory and storage charges would be entirely absent, and the machines could be run over a much larger lot than the equation specifies.

Uses Rotary Foundry Melting Furnace

German Plant Makes Gray Iron and Malleable Castings from Horizontal Cylindrical Shell Fired with Powdered Coal

A FURNACE of unique design, called the Brackelsburg furnace, has recently been put into operation in Germany in the production of high-quality gray and malleable castings. The originality in the design arises chiefly from the fact that the furnace is a horizontal, cylindrical shell, rotating during melting and superheating, and fired with powdered coal. The general features are given in publication No. 131 of the Kaiser Wilhelm Institut für Eisenforschung, Dusseldorf.

The shell, which is of steel plate, is about 16 ft. in length and 5 ft. in outside diameter. It is lined with fire-clay and silica brick and has a capacity of four to five tons. The flame enters one end and leaves at the opposite end, no provision being made at present for recovering waste heat in the stack gases. Charging is effected through the outgoing gas opening. The metal is tapped from an opening on the long side of the furnace.

Rate of Revolution Slow During Melting

Rotation of the furnace is accomplished by a ½-hp. motor. During melting the rate of revolution is comparatively slow, speeding up as the charge becomes liquid. In this way rapid exchange of heat between the "roof" and the metal charge is obtained.

Use of a very hot flame and the possibility of bringing the colder parts of the charge into repeated contact with it result in a short period of melting and only a slight oxidation loss. Owing to the blanket of slag which covers the metal as soon as it is melted, and which is not pulled away by rotation, the contamination of the iron by gas and oxides is very slight.

A comprehensive study, recently completed, deals with the heat and materials balances of two heats of malleable and one of gray. Among other factors studied was the fuel consumption. It was found that for the malleable

heats about 13.5 lb. of coal were used per 100 lb. of iron charged, while for the gray iron heat 9.7 lb. were used. This, it is pointed out, compares favorably with any other type of furnace of the same size. The fuel would doubtless be considerably reduced in a large furnace, where equipment for utilizing the heat in waste gases would be available. The metalloid loss is given in an accompanying table:

A further conception of the operation of the furnace is given by the accompanying heat balances, which are expressed in per cent on the total heat input.

Table of Heat Balances in Per Cent of Total Heat Input

(A) Input	Malleable	Malleable	Gray
In charge.....	0.16	0.18	0.05
fuel.....	96.85	95.17	95.00
metalloid loss.....	2.99	4.65	4.95
Total	100.00	100.00	100.00
(B) Output			
In iron	31.52	27.31	39.09
slag	2.56	3.73	4.60
waste gas	51.10	55.36	45.05
Incomplete combustion.....	8.07	2.26	4.35
Dust, evaporation of water, etc.	2.35	3.12	2.79
Unaccounted for.....	4.40	8.22	4.12
Total	100.00	100.00	100.00

The tonnage melted per hour in the three heats was, respectively, 0.55, 0.46 and 0.60. This could, no doubt, be increased if some use were made of the fifty odd per cent of the heat now passing up the stack.

Savings from Use of Materials-Handling Equipment

Fully 80 per cent of the manufacturing plants not accustomed to the use of material-handling machinery, and particularly overhead machinery in large ways, do not realize the savings effected through the application of these two principles of handling materials. This is the conclusion reached by E. T. Bennington, manager, Cleveland Electric Tramrail Division, Wickliffe, Ohio, in a paper before the American Society of Mechanical Engineers' Akron meeting.

It is true that it is difficult for any engineer to determine definitely just how great these savings will be. It is one of those things for which no definite plans will probably ever be developed for calculating purposes, because of the various conditions encountered in the plants. But it is not difficult to go back, after these principles have been adopted by some manufacturer, and compare the cost under the new scheme of things with that existing before their application.

Table of the Loss of Metalloids

Heat	C	Si	Mn	P	S
Malleable	%	%	%	%	%
Charged	3.31	1.25	0.19	0.068	0.059
Finished	2.82	0.99	0.16	0.072	0.077
Loss	0.49	0.26	0.03	0.004*	0.018*
Malleable					
Charged	3.33	1.25	0.19	0.069	0.063
Finished	2.88	0.87	0.15	0.078	0.057
Loss	0.45	0.38	0.04	0.009*	0.006
Gray					
Charged	2.80	3.62	1.24	0.076	0.023
Finished	2.79	3.28	0.98	0.090	0.028
Loss	0.01	0.34	0.26	0.014*	0.005*

*Gain.

Aeronautical Aluminum Foundry

All Castings for Several Types of Wright Airplane Engines Made in New Plant—Unusual Daylight and Absence of Fumes

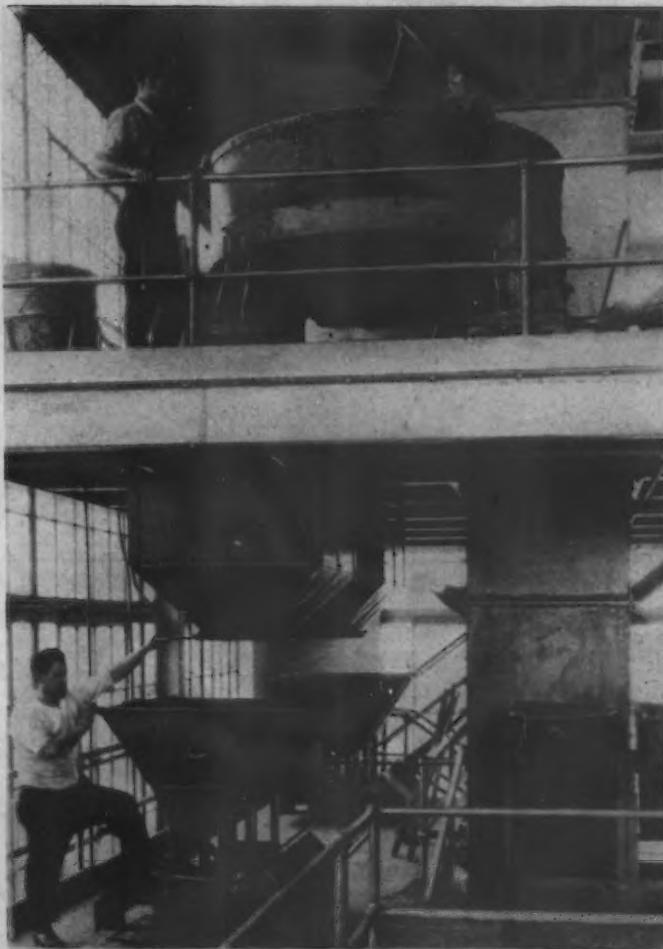
BY FAY LEONE FAUROTÉ*

IN several respects, the new Wright Aeronautical Corporation foundry in Paterson, N. J., is unique. It has a basement; it is so light and airy that artificial light ordinarily is not needed; there is an almost complete absence of fumes and odors arising from core-making and casting. It is devoted entirely to the manufacture of aluminum castings, except for an occasional bronze or experimental casting called for by the engineering department.

Seven major castings, comprising the important units of the Wright "Whirlwind" and "Cyclone" aeronautical engines, are made of aluminum alloy. Few foundries in the United States are equipped to make such aluminum castings commercially. After attempting to buy them outside, with more or less indifferent success, the Wright engineers concluded that, to obtain castings of their required excellence, it would be necessary for them to install their own foundry, specify their own aluminum alloys, make and bake their own cores, and have all parts and processes under their immediate control and supervision. From the beginning of their commercial manufacture, Wright aluminum engine parts have been made in their own plant. This applies also to the smaller minor parts, as well as those major components mentioned.

More than a year ago it was apparent even to the casual observer that the former foundry facilities were inadequate. Located on the first floor of the original wing, poorly lighted, cramped in space, it was difficult for even good foundrymen to return a high percentage of sound castings. And so the new foundry, 562 ft. long, 102 ft. wide, has been built of steel, glass, brick and concrete.

Mainly one story high, the building has a three-story section at one end, the second and third stories housing



Simpson Sand Mixer at Top Mixing Sand With Oil for Making Cores and Molds. Sand is let out left side of mixer, dumped down into conveyors on the next floor and then hauled to the distributing point in the core and mold shop. On the right the square stack is the conveyor or elevator which hauls sand up from storage into mixer

group recently erected on the original site a few hundred feet away.

Ample Room for Expansion

Designed by the Wright foundry engineers, the building was erected by the John W. Ferguson Co., Paterson. It is located on a piece of land recently acquired by the Wright company, comprising some 17.4 acres, so there is ample room for future expansion in the 15.6 acres left. At the present rate of growth of the aeronautical industry, it will not be surprising if this foundry capacity, large as it now is, will need to be doubled within the next year or two. At present writing, the foundry is able to take care of 500 engines a month.

It has been pointed out by officials of the Wright foundry that the crankcase castings are especially diffi-

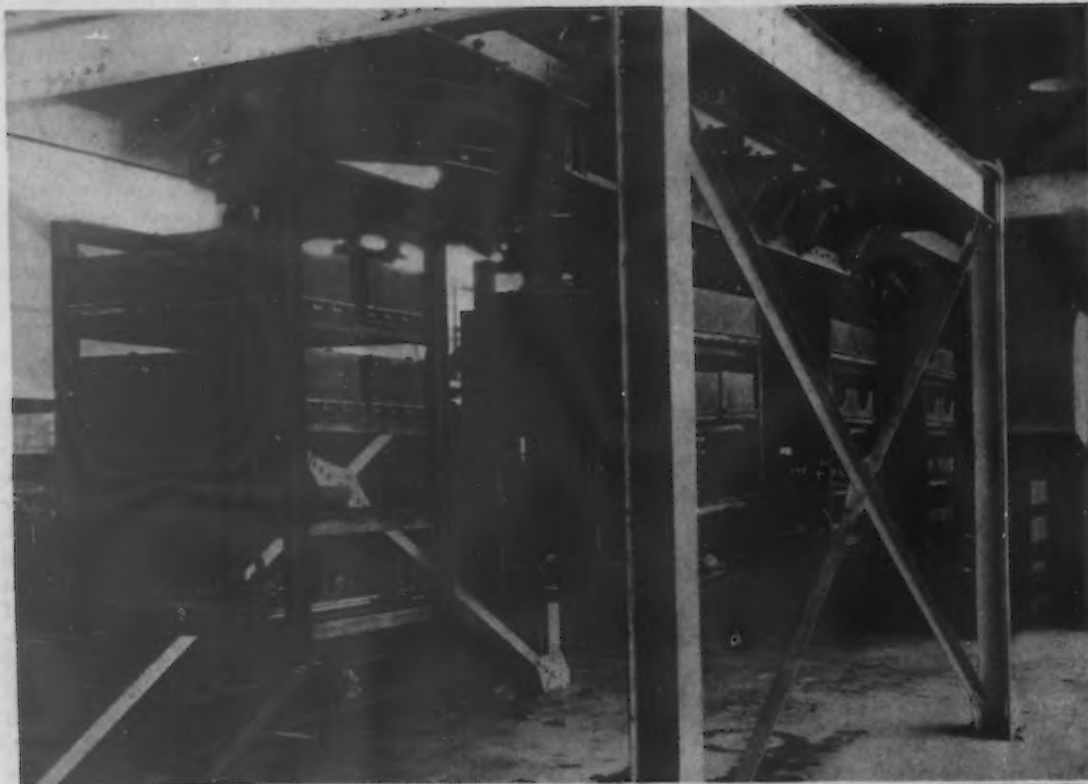
the wood and metal pattern shops. A full basement runs the entire length, and, the main floor being built about 4 ft. above grade, this permits windows in the basement walls. The first floor is of flat slab reinforced concrete construction, and the main story of structural steel, with center bay 40 ft. wide by 26 ft. 7 in. clear height, each side bay being 31 ft. wide with an average height of 17 ft.

Sidewalls are brick to the window sills, with steel sash from there to the roof. These sash have large ventilating elements, and the monitor sash also ventilate. The roof is of reinforced concrete.

Three main sections comprise the main floor. One for core making, one for molding and one for cleaning, heat treating, pickling, inspection, shipping and offices. In this latter section the cleaning department, heat-treating furnaces, pickling, welding and inspection departments are housed, each in a separate room.

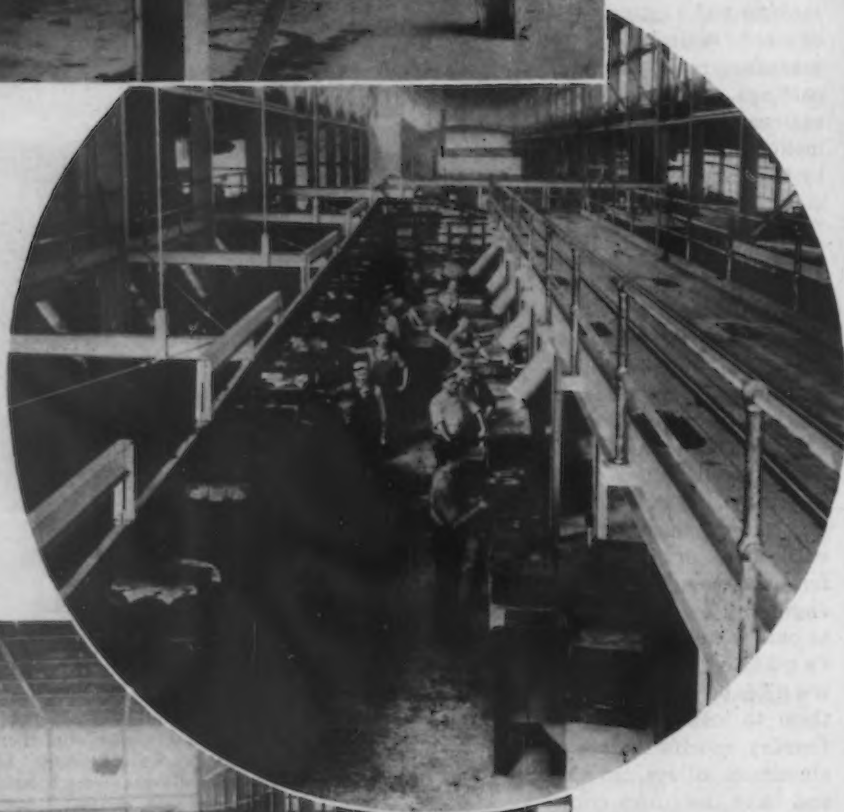
Altogether, this new Wright unit adds some 128,000 sq. ft. to the already rapidly growing

*Mechanical engineer, New York.

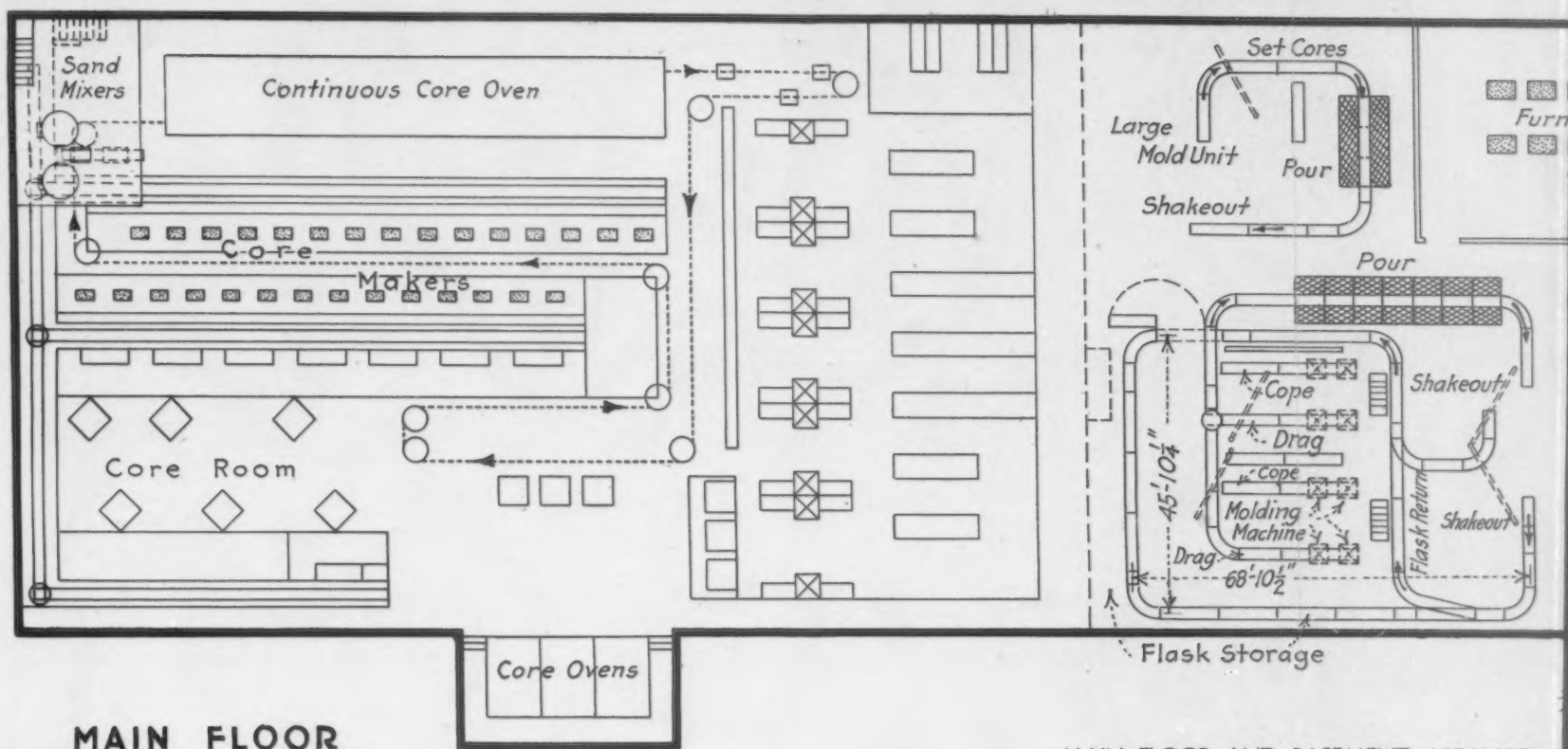


CORES, in Racks on Endless Chain, Emerging from Continuous Core Oven

ONE Boy in Core Room (in Circle) with the Trays Depending at Left from the Endless Chain. Coremakers at right load cores on the trays as they pass slowly by. Track above coremakers serves to distribute core sand, which is dumped through the screens into chutes as needed



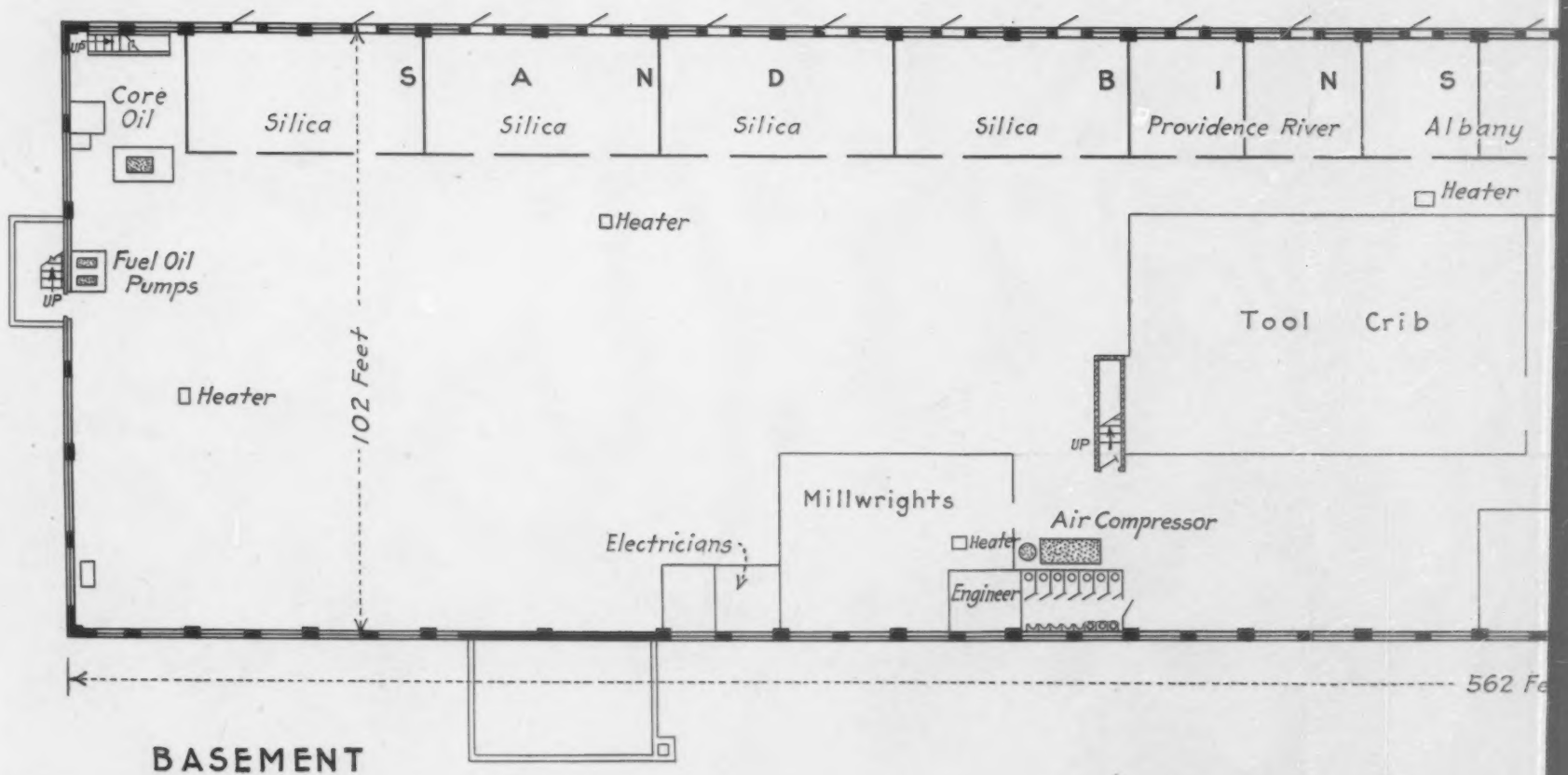
ROLLER Conveyors for Crankcases, with a Pouring Station in Fore-ground



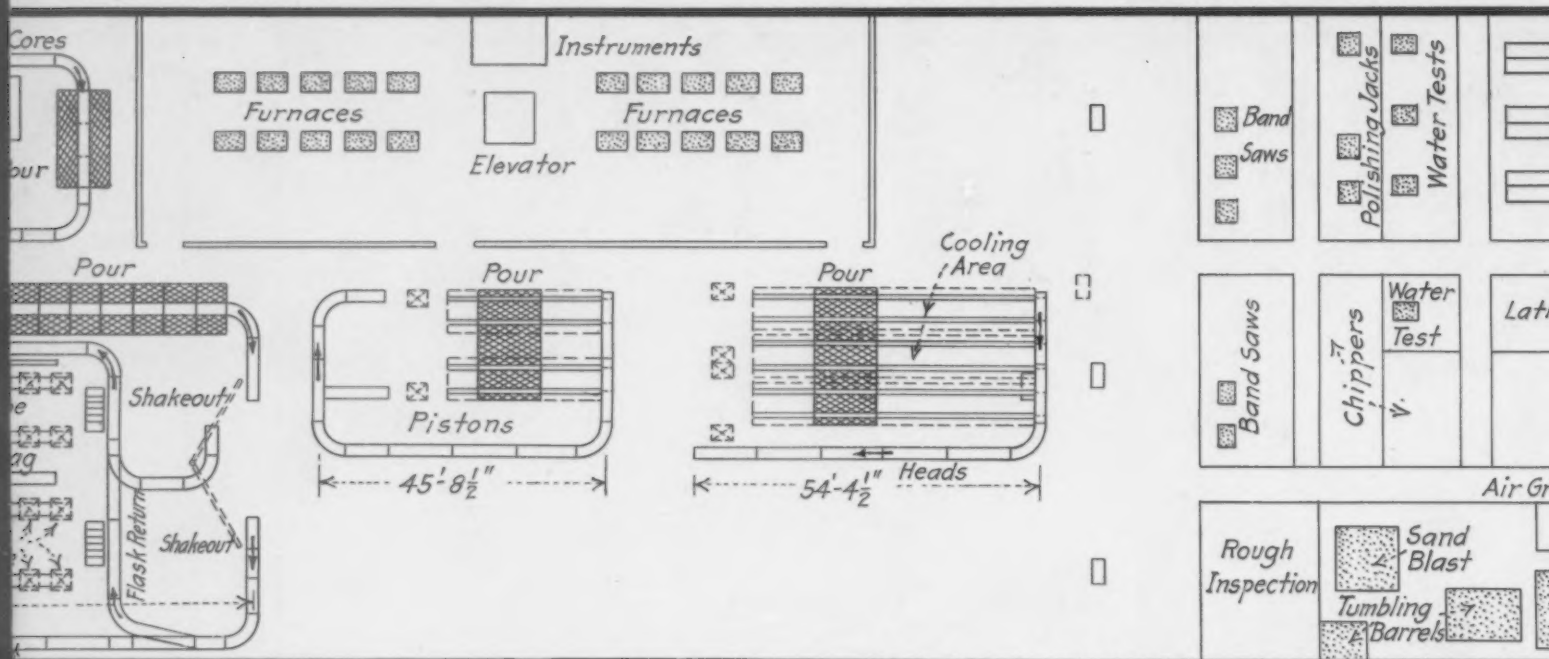
MAIN FLOOR

MAIN FLOOR AND BASEMENT ARRANGEMENTS

THE self-cooled
Core rack
core makers, which
of the 562-ft. building
ground, it has un-

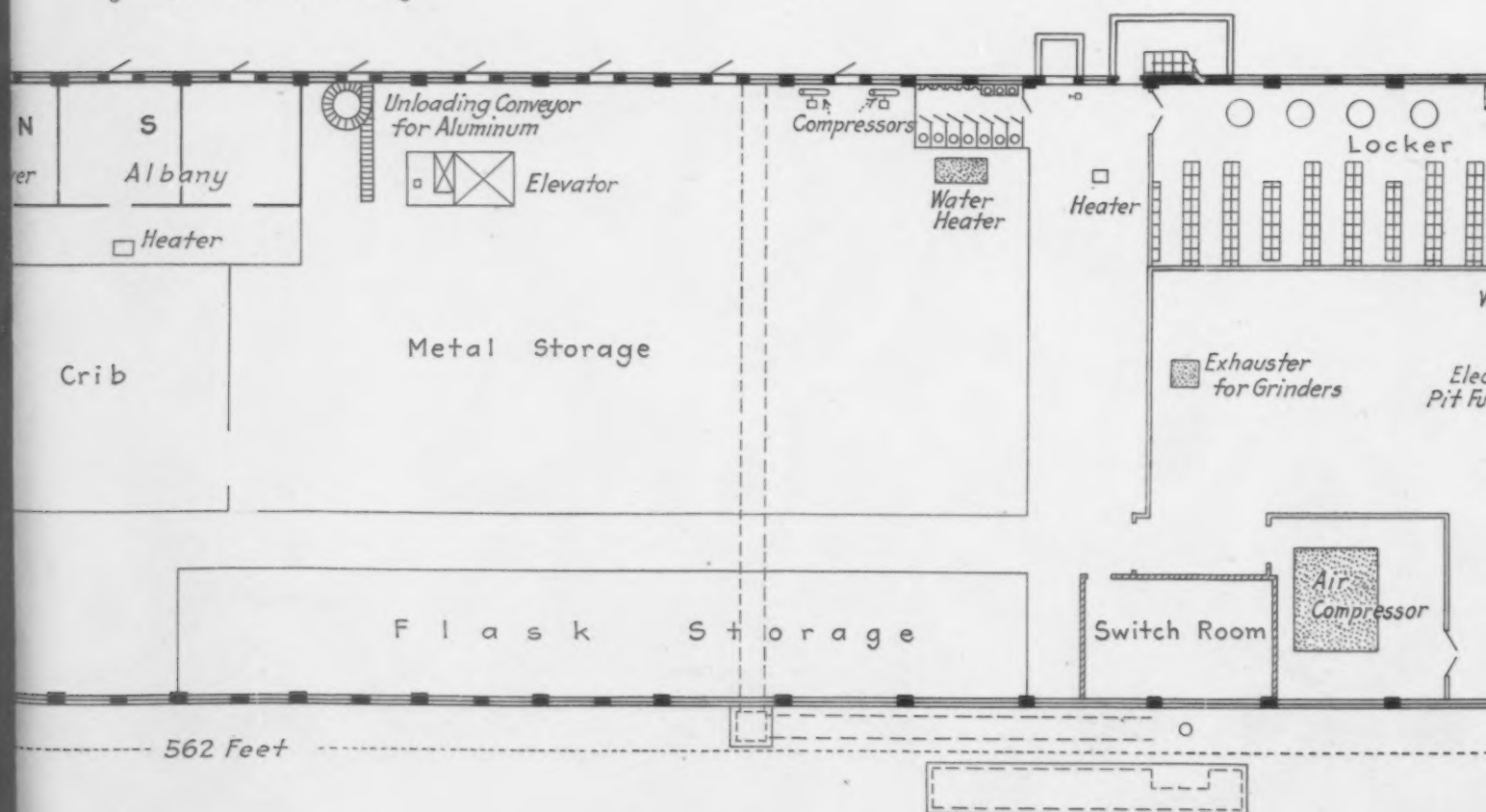


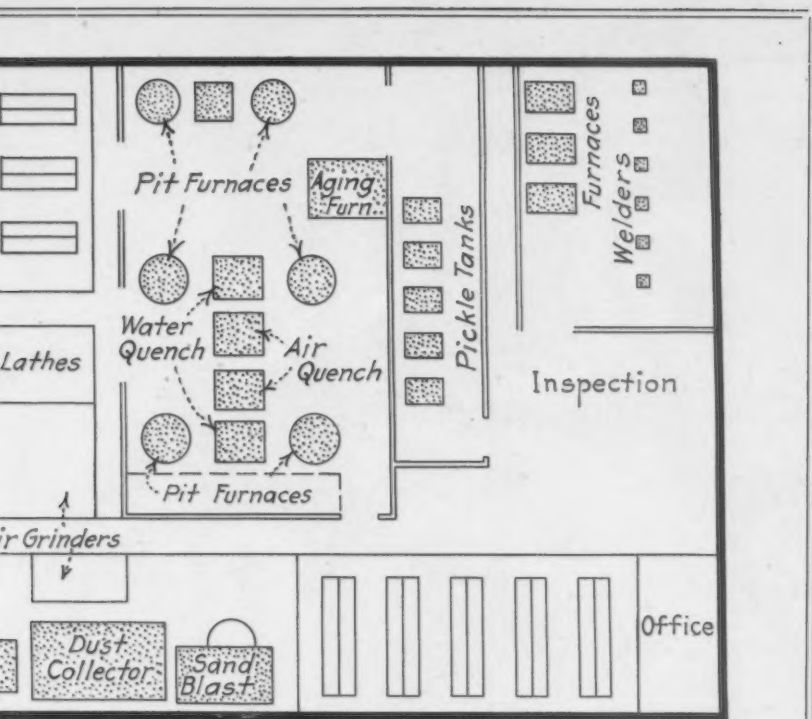
BASEMENT



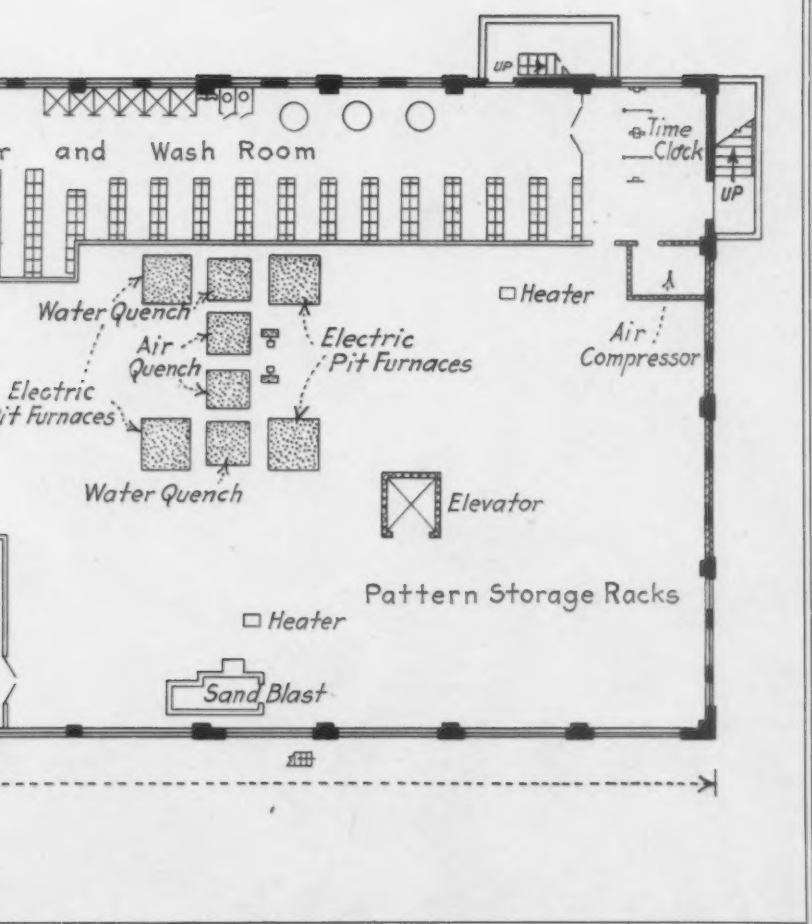
BASEMENT ARRANGEMENT IN THE NEW ALUMINUM FOUNDRY OF THE WRIGHT AERONAUTICAL CORPORATION, PATERSON,

THE self-contained units for molding and pouring, all four in close proximity to the melting furnaces, are a feature. Core racks suspended from the traveling chain running through the continuous core oven pass slowly by the core makers, who load the racks as they pass. Cleaning, inspection and heat treating are handled at the other end of the 562-ft. building. This arrangement avoids cross-hauling of materials in process. As the basement is well out of the ground, it has unusual natural light.



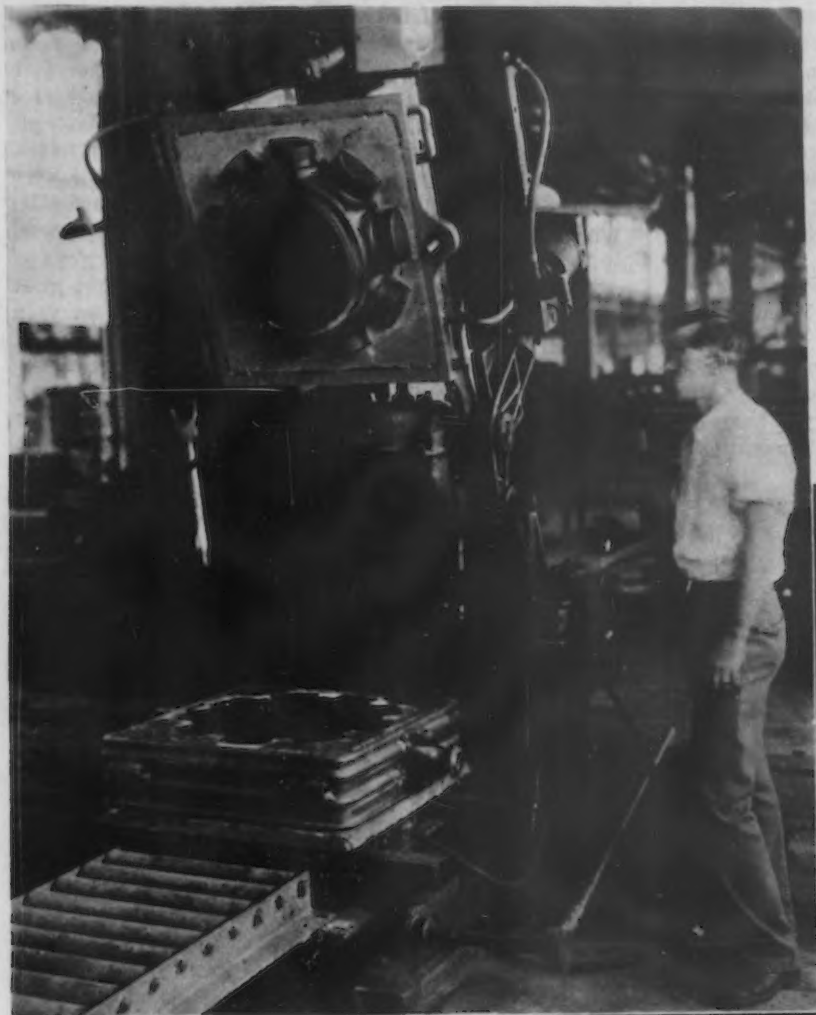


ON, N. J.



cult of production, as are also the cylinder head and piston. The cylinder head is a completely cored job. Other jobs are elaborate in the extreme, difficult to mold, requiring many cores and chills, multitudes of nails, trick venting and careful pouring. In the rear crankcase section alone, some 40 cores are used.

in the automatic conveyor ovens for about 3¼ hr. A Gehrich continuous core oven is employed, oil-fired and with the temperature automatically controlled. Four sets of twin burners supply the heat, one of each pair operating continuously, the other automatically cutting in and out when the recording pyrometers indicate an over



TABOR MFG. CO. Compressed-Air Molding Machine (Left) Used in Making the Heavier Molds

* * * *

CLOSING Seven - Cylinder-Crank-Case Molds (Below) with Aid of Pneumatic Hoist



In the "Whirlwind" series of five-, seven-, and nine-cylinder engines, 94 per cent of the parts are interchangeable, under the new design. But the crankcase sections, of course, owing to the number of cylinders used, cannot be made so. Furthermore, there are needed the castings for the "Cyclone," the large 525-hp. Wright radial, the new inverted-V Wright engine, the marine power plant and a considerable amount of experimental work which always must be done.

Larger cores, which take much time, are baked in the usual manner in large stationary ovens. But all but the very large ones are loaded on to pendant shelves and carried through the continuous ovens on automatic conveyors. There are three rack-type core ovens in use, also, supplied by the Foundry Equipment Co., Cleveland. Racks of cores are put in and removed by means of an Elwell-Parker electric lift truck.

Baking Cores in Continuous Oven

Most of the cores are made in special core-molding machines. The sand is mixed with oil core compound (containing roughly 80 per cent of linseed oil) and baked

or under temperature. The core-baking oven is maintained at 470 deg. Fahr.

While the core conveyor chain is 660 ft. long, only about 250 ft. of it is in the oven. It moves about one foot a minute, and a carrier takes some 11 hr. to make the round trip from loading through oven to unloading, loading and back again.

Conveyor carriers pass down through a row of 25 core

machines, where the cores are made and loaded directly on the carriers by the men making them. This line of conveyor travels on an inclined track, so that empty shelfroom is always available to the various operators along the line, at about the same loading level.

From here the carriers are conveyed through the baking oven. In discharging them from the oven the conveyor takes them to a cooling zone. They are then carried alongside the unloading benches, where the cores are unloaded from the conveyor carriers and then continued through the subsequent process of blacking and pasting. The empty carriers of the continuous conveyor then repass through the loading section as before. The carriers are spaced 6 ft. apart and each carrier handles a load of about 1000 lb of cores and core plates. The system provides a loading surface of approximately 3600 sq. ft. of shelf area each 9½-hr. day.

Oil-burning equipment used for heating the continuous core oven is of the induced draft type. It is mounted directly underneath the oven and is equipped with automatic temperature control. From preliminary estimate, the operation in this oven is to bake 300 lb. of cores on each gallon of oil burned. The oven and dryer has an overall length of 125 ft., width of 14 ft. and height of 14 ft.

Baked cores as unloaded from the conveyor oven are pasted and painted with a blacking, to provide a smooth pouring surface. This paste and blacking finish is baked

on to the cores in six direct gas-heated ovens set up in pairs, conveniently located in the core department.

These cores cover practically all of the various parts required in the manufacture of Wright motors, such as fin body, pistons, barrel cores, runner box, crankcase cores and a large variety of smaller parts.

International core machines are used. The core sand, which comes from southern New Jersey, is elevated from the basement to the mezzanine floor in the main building, where it is mixed in a Simpson sand mixer with Woodseed core oil. It is then dropped into four-wheeled hopper cars running on a track on an elevated platform, rolled along as required and dumped into chutes which, in turn, discharge at convenient stations near the core machines. Each hopper car can be dumped at either side; a sheet steel apron, covering the wheels, directs the sand into the head of the chute.

Some of the core sand is used over again, but most of the used sand is shoved through a grating on to a belt which carries it outside the building to a dump cart.

Molding sand comes from the Albany, N. Y., neighborhood. This is of course, after use, reconditioned, aerated and used over again. A Royer sand separator and blender and an Axman sand cutter are employed for reconditioning.

[A second article will cover the careful heat treatment required in making aluminum aircraft castings and the wood and metal pattern shops.]

Alloy Steels in the Railroad Field

A PAPER entitled "Alloy Steels in the Railroad Field" was read before the annual meeting of the American Society of Mechanical Engineers by Charles McKnight, International Nickel Co., New York, which hardly covered the ground indicated in the title. The author confined himself to locomotive parts, and while he mentioned many alloys, dwelt particularly upon nickel steels and irons. Considerable space was given to alloy steel castings for side frames, alloy cast iron for cylinders, and nickel steel plate for boilers, all of which have been described at length in THE IRON AGE within recent years.

Much emphasis was properly laid upon the fact that the purchaser of alloy steel should expect to pay at least a cent a pound for "quality"—representing high-grade raw materials and extra care in manufacture—and that old-fashioned carbon steels, when given equivalent attention, are capable of unusually good properties. Mr. McKnight assumed a critical attitude toward "semi-alloy" steels, recommending that analyses with an ample proportion of alloy be selected, but only for places where the best of plain carbon steels are deficient.

In discussion, A. W. Minuse, Central Alloy Steel Corporation, Canton, Ohio, said that a considerable amount of stainless iron (low carbon, 18 per cent chromium alloy) has been used during the last two years for firebox plates and syphons. It does not scale at operating temperature, and its brittle-temperature range is enough higher than that of best quality flange steel that higher pressures can be safely carried in the boiler.

J. R. Campbell, Baldwin Locomotive Works, Philadelphia, recalled that his company's experience on heat treated high carbon and alloy steels dated back at least 25 years, and he was personally acquainted with a fleet of over a dozen locomotives which were built and equipped 15 years ago with forged nickel-chromium steel side rods and pistons. Owing to a combination of good design, good steel, good forging, good heat treatment and careful ma-

chining, these parts had given excellent service; reported troubles having been limited to two piston rods. Ten-inch wrist pins on a group of electric locomotives built 14 years ago were made of plain high carbon steel (carbon 0.70 per cent, manganese 0.65 per cent). These were oil quenched and drawn under accurate pyrometric control; test bars gave ultimate strength 140,000 lb. per sq. in.; elastic built, 90,000 lb. per sq. in.; elongation 13 per cent and reduction in area 20 per cent; despite these excellent figures and good impact tests, these wrist pins were unsuccessful. Engines built today are reaching loads of 170,000 lb. on a piston, which in Mr. Campbell's opinion requires a quenched and drawn steel.

G. M. Eaton, Molybdenum Corporation of America, Pittsburgh, said that since wrist pins are subject to rapidly alternating stresses, their failure is frequently due to fatigue. Fatigue or endurance strength of steels appears to be more intimately related to the ultimate strength of the steel than to any of the other tensile properties, but the figures available for designers had all been determined from small samples with polished surfaces. It is known that scratches or lack of well rounded fillets reduce the endurance limit seriously; also that a hot-rolled bar with the mill scale on it may fail under alternating stress at half the loading to be expected. Consequently there was a great need for fatigue tests on full-size machine parts.

Mr. Eaton was confident that plain carbon steels should be used on locomotives wherever it is good enough for the working loads. Especially did he criticize use of case hardened or nitrided materials for essential parts like main pins or axles, calling attention to the well known facility, with which a crack in the hard brittle surface is propagated through the ductile core. If hard wearing surfaces are desired, these should be produced on thin bushings, which can be shrunk on; if they crack it only causes a train delay.

Modern Trends in Alloy Steels

Meeting Demands for Better Rails—Tests on a Chromium Rail—Modern Cutting Tools Compared— What Constitutes an Alloy Steel

LAST February, at the annual meeting of the American Institute of Mining and Metallurgical Engineers, the James Douglas Medal was awarded to Dr. Paul D. Merica, director of research, International Nickel Co., New York. Because of a protracted illness, Dr. Merica was unable to be present to receive the medal at the annual banquet of the institute at the Waldorf-Astoria Hotel, Feb. 20. (*THE IRON AGE*, Feb. 28, page 608.) It was announced, however, that the medal would be publicly presented at some future date.

Douglas Medal Presented to Dr. Merica

On Wednesday evening, Dec. 4, at a meeting of the New York Section of the institute, the medal was formally presented to Dr. Merica. The presentation and technical session which followed were preceded by a dinner at the club rooms of the Building Trades Employers' Association, 2 Park Avenue, New York. Immediately following the dinner, Stanislaus Skowronski, research chemist, Raritan Copper Works, Perth Amboy, N. J., chairman of the institute of metals division, formally notified Dr. Merica of the award of the medal.

In an appropriate speech Dr. Merica accepted the honor, dwelling briefly upon the fact that three of the six recipients of the medal since 1923 are members of the institute of metals division, and calling attention particularly to the fact that investigations in this field are divided primarily into two divisions—the extraction of the metal from the ores and the industrial applications of the metals in general. He emphasized the obstacles involved in finding applications, especially new ones, for certain metals and pointed out that this work is even more difficult than the extraction of the metals.

Recent Developments in Alloy Steels

FOLLOWING the presentation of the medal, C. E. MacQuigg, director Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y., delivered an address on "Recent Developments in Applications of Steels," followed by some discussion by a few of the hundred or so metallurgists present.

In general Mr. MacQuigg's discussion embraced only the alloy steels. Plain carbon steels have not made any new departure in composition in recent years, although there are many interesting expansions in their application, said Mr. MacQuigg. In 1928 of the 51,544,180 gross tons of all kinds of steel produced, 3,214,909 tons, or 6.2 per cent, was alloy steel, according to the data of the American Iron and Steel Institute. The whole story of steel has been one of constant progress, a consistent effort to meet the ever-increasing demands for enhanced properties. An example, taken from the experience of ordnance makers, is typical—shells to pierce the invulnerable armor and then armor to withstand the armor-piercing shell. At present, the shells seem to have it.

After discussing the progress which has been made in the application of steel in bridges and pointing out how the tensile strength in the latest bridge involves steels having strengths of 225,000 lb. per sq. in., the speaker dwelt briefly on rail steels in which field a jack-

ing-up process has also been applied to the physical properties. This is because unit stresses are being raised, due to the ever-increasing wheel loads. This has led not only to an increase in the weight of the rail section, but to the marked raising of the carbon content to make a stronger and stiffer rail.

Inasmuch as rails may at times develop unit stresses of between 50,000 and 100,000 lb. per sq. in., the trial of alloy steel is not an illogical step. Heat treatment of the plain carbon steel rail is also being developed. In regard to the 13 per cent manganese rail, Mr. MacQuigg pointed out that this metal exhibits extreme resistance to wear when severely punished by pounding and shock, coupled with unusual toughness. The rail, however, is expensive and, since the disposal of scrap is a serious question, the use is restricted. Following the satisfactory results obtained by medium high-manganese steel for forgings, the medium-manganese rail has been developed. Its use has expanded notably in the past few years, the annual consumption by one system alone having risen from 50,000 to 80,000 tons in three years.

One factor in connection with the development of better steels for rails is that conditions are changing to such an extent that the exact requirements for the ideal material cannot be determined. One developed line of attack is to increase greatly the elastic limit of the steel, rather begging the question of ductility on the supposition that rail failures, other than wear, are resulting from excessive deformation, these, in turn, leading to the development of internal flaws.

Chromium Steel Rails Stand Tests

The speaker then referred to some work recently done on a 3 per cent chromium low-carbon steel rail. The idea is to make use of the high wear-resisting and air-hardening properties of such steel. Such a composition, it was argued, would give a dense, small grain in the center of the rail head, plus high tensile strength and wear resistance due to the chromium content. At the same time ease of machinability, as well as toughness and ductility, would be assured by the low carbon. Drop tests on these rails, using a 2000-lb. tup with 22-ft. drop, have shown that they possess greater stiffness and better distributed ductility than the plain carbon or medium-manganese steel rails of smaller section. Slides were shown of the Brinell hardness of the sections as cooled on the hot bed; these were in the neighborhood of 360 to 390. In spite of these high hardness values, said Mr. MacQuigg, the rail machines with ease and the drop tests were surprising in the number of blows required to break the sections. Final decision, however, must await rail tests in service.

The speaker alluded to a recent report on the behavior of a high-chromium rail steel in England, which is decidedly favorable. The rails contain about 1 per cent chromium with carbon about 0.50 per cent, manganese 0.80 per cent and silicon 0.20 per cent. Wear resistance of these rails has been exceedingly good.

Elimination of transverse fissures may not be expected to result from the use of alloys if, as seems to be the present consensus of opinion, they originate in the process of manufacture. Alloys will only add strength, toughness

or resistance to wear, and under some conditions may require better manufacturing technique.

Stronger Steels for Airplanes

DISCUSSING steels for dynamic use, as contrasted with those for static use, Mr. MacQuigg reviewed the substitution of metal for wood in airplanes, stating that the latest step is the use of sheet metal for fabric and that the day of the all-metal plane has already arrived—at least for the larger units. There is an increasing demand for high-tensile wire for airplanes. Where construction permits, very high unit stresses may be carried and high tensile strength can be developed by wire drawing. This will be used in the absence of stresses of compression or bending. Chromium-molybdenum steel is being largely used today in the joints of aircraft frames and in the fuselage itself, this steel having been selected because of its toughness and partly on account of its reliability under heat treatment.

Improvements Made in Cutting Tools

REFERRING to cutting tools, increased production per unit of labor time is brought about by cooperation of the metallurgist and the machine tool builder. The metallurgist's duty is to produce a tool that can do more work than its predecessor and the engineer must then build machine tools that can take advantage of this increase in ability. Cutting tools in general use are made of plain carbon steel, high-speed steel and Haynes stellite. When each of these tools was introduced it was a great improvement upon those in existence and each has contributed greatly to industrial developments.

By the use of Haynes stellite tools, it is now common practice to fully machine cylinder blocks at a cost of \$1.13 for direct labor, this charge including all of the work necessary to make the rough casting ready to be placed in the motor assembly line.

High-Speed Steel 20,000,000 Lb. Annually

It is estimated that about 20,000,000 lb. of high-speed steel is produced annually, with the following distribution: Twist drills, reamers, counterbores and formed tools of that type, 30 per cent; cutters, hobs, mills and formed tools of similar type, 25 per cent; disks, punches, etc., 15 per cent; turning tools for lathes, for planers, shapers and boring tools, etc., 20 per cent; with other uses totaling 10 per cent. It is estimated that \$200,000,000 a year is saved by the use of high-speed steels in the manufacture of automobiles alone. This represents only actual savings due to decreased machining expense and does not take into account savings resulting from decreased costs of additional machines and other facilities. It has been estimated that less than \$1,000,000 in tungsten for high-speed steel saves from two to three billion dollars annually.

Haynes stellite, however, has not and never will displace high-speed steel which, in turn, did not displace carbon tool steel, each having a field in which it is superior to the others. The field for stellite is that of machining cast iron and for turning steel under fairly rigid conditions. The greatest field for high-speed steel tools today is the turning of steel parts on full automatic and semi-automatic machines. Plain carbon steel tools find their most valuable application for some kinds of finishing work and various turning jobs.

Effect of Tungsten Carbide Tools

Referring to the latest developments in this line, tungsten-carbide tools, the speaker said that during the past two years tools of this kind have been given more or less extensive trials by several manufacturers. Owing to their high mineral hardness, which lies between corundum and diamond on the scale, these tools will machine products which have heretofore been considered unma-

chinable, such as glass, porcelain, fiber, manganese steel and hardened steels. It seems that they will probably be very successful for the turning of cast or chilled iron, on which kind of work they will have a life long enough to justify their high cost. It is also probable that machine tools will be built that will enable the manufacturer to take advantage of the fact that they can be run at higher speeds, thus resulting in still lower labor costs per unit of product. Their general utility for turning and cutting steel is at this time not so well assured, said Mr. MacQuigg.

These tools, however, offer the possibility of a distinct and definite change in the types of steels used for certain particular purposes. If it should prove feasible to use them for turning, milling and drilling harder steels than can be handled by present practices, it will be possible for the manufacturer of automobiles and other machines to use harder, and consequently stronger, steels for parts subject to heavy stresses. Such parts as crankshafts would be hardened, but would still be machinable with these tools. This opens up the possibility of using lighter sections and securing all the indirect advantages which would usually result from a decrease in the weight of moving parts.

About 25,000 Tons of High-Chromium Steel Made Each Year

DISCUSSING the field of high-chromium corrosion-resistant steels, it is estimated that the total annual production is about 25,000 tons. The largest expansion is probably taking place in the fields of chemical technology and the food industry. These steels are, however, being used by the metallurgical and mining industries as well as by the petroleum engineer in his processes for oil cracking. One installation of a high-chromium nickel alloy alone will amount to several hundred thousand dollars in an ore-leaching process where the question of difficulty of replacements in an isolated situation very greatly outweighs considerations of first costs.

Locomotives Largest Field for Alloy Steels

In the discussion which ensued, Charles McKnight, metallurgist, International Nickel Co., New York, took some exceptions to the statement of the speaker regarding plain carbon steels. When alloy steel first appeared about 20 years ago, there was much difficulty in making a satisfactory product. As the technique and process improved, there was a corresponding enhancement of the quality of plain carbon steels and today these are of a much higher grade than they formerly were. The largest future use of alloy steels will be in the locomotive field, said Mr. McKnight. There is a constantly increasing use of these steels in forgings and castings incorporated in locomotives as well as in the boilers themselves.

In the 15 years before the war, when he was engaged in constructing copper smelters in the West, E. E. Thum, THE IRON AGE, New York, said that the various grades of steel which were available were decidedly limited. He vividly contrasted the situation today when numerous alloy steels of varied composition can be selected to accomplish difficult undertakings which greatly simplify the problems of the metallurgist and the engineer.

A Definition for Alloy Steels

Calling attention to the fact that we are dependent entirely upon the statistics gathered by the American Iron and Steel Institute as to the output of alloy steels, E. F. Cone, THE IRON AGE, New York, stated that there is no clear understanding of just what an alloy steel is and the statistics do not fully reflect the entire production. The statement of Mr. MacQuigg that copper-bearing steel is regarded in his discussion as an alloy steel is interesting. The statistics of the institute do not include the medium-manganese rail steel, of which a large quantity is made

each year. In some quarters it is contended that a true alloy steel is one which contains as a minimum 0.50 per cent of the alloying element. If this definition were accepted, it would rule out several of the important steels, such as carbon-vanadium and carbon-molybdenum steels and copper-bearing steels, all of which are now regular products. He also pointed out the confusion concerning the nomenclature of the high-chromium and the high-chromium nickel steels, a situation which certainly should be clarified.

Dr. F. M. Becket, vice-president, Union Carbide & Carbon Corporation, New York, could not agree to the statement that 0.50 per cent should limit the quantity of the alloying element for defining an alloy steel. He quoted a definition which he considered as excellent; namely, that an alloy steel is a plain carbon steel in which the addition of an alloying metal changes the properties of the steel. Asked as to whether he meant by this physical and chemical properties, such as non-corrosive qualities, he said that he would include both.

Effect of Composition on Hardness of Tungsten Steels

VARIOUS divergent results arising during the making and treating of tungsten steels led W. Zieler, *Stahl und Eisen*, 49 (1929), pages 1083 to 1084, to determine the effect of composition and drawing temperature on the hardness values.

Annealing and cooling are of primary importance in the formation of carbides in this system. Thus in the intermediate and higher tungsten steels, normal cooling favors the formation of a double carbide. With longer time near the critical temperature and slower cooling, this double carbide tends to split off more or less WC. However, small additions of chromium tend to prevent the decomposition and the splitting off of WC.

In tungsten steels the phases present may be classified as Fe_3C , Fe_2W , WC, and two double carbides (known as Zr - and Zr -carbide). In the lower carbon ranges, the Fe_2W is stable, yielding, as the carbon increases, to the double carbides. WC appears as the stable component, unaffected by annealing, in the higher carbon steels.

Although the original results are given in the form of a space model, a few data tabulated below will serve to illustrate, in the general, the findings:

Series with 0.8 Per Cent C—Oil-Hardened.

W, per cent (approx.)	0	1	5	10	15	20
Best Brinell hardness	311	311	425	343	401	321
Drawing temp., deg. C.	1200	1250	1050	1150	1250	1200

Same—Water-Hardened.

W, per cent	0	1	5	10	15	20
Brinell	447	495	506	290	262	212
Temp., deg. C.	880	900	900	880	900	820-900

Series with 0.7 Per Cent C; Oil-Hardened; Normal St. Content.

W, per cent	0	1	5	10	15	20
Hardness	305	712	627	653	627	627
Temp., deg. C.	950	850	1000	1000	1000	1100-1300

Same but with 0.5—0.9 Per Cent St.

W, per cent	0	1	5	10	15	20
Hardness	305	550	630	534	500	510

In no case could as high a degree of hardness be obtained with high-silicon contents as with low.

Series with 1.1 Per Cent C; Oil-Hardened.

W, per cent	0	1	5	10	15	20
Brinell	578	555	601	601	601	653
Temp., deg. C.	1250	1250	950	1050	1050	1050

Series with 1.4 Per Cent C; Oil-Hardened.

W, per cent	0	1	5	10	15	20
Brinell	534	534	601	682	712	712
Temp., deg. C.	900	800	850	800	750 to 950	750 to 1100

Worthy of mention, in the case of the higher tungsten steels, is the attainment of a good hardness at low temperatures (750-800 deg. C.) as well as a large hardening range. The figures given represent the best hardness values obtained for each steel with the corresponding temperature.

Limit of Carbon Content Determined by Forging Properties

Further study showed that the hardness was retained above 23 per cent tungsten and with carbon contents as high as 0.07 per cent for each per cent of tungsten (or 1.61 per cent C. with 23 per cent tungsten). In general, the upper limit of carbon content is determined by the forging properties.

In order to test out one of the steels, the last-named one above (20 per cent W, 1.4 per cent C) was used to cut a chill-cast roll, which exhibited about 50,000 lb. a sq. in. tensile strength. Against this material the tool stood up for 1½ hr., cutting at the rate of about 13 ft. a min. with an 0.008-in. feed and an 0.01-in. chip. Further improvement was noted on the addition to the alloy of 0.6—0.7 per cent Cr.

Large Trailers Minimize Quantity-Delivery Costs

WITH the aim of minimizing costs, the Atlas Steel Barrel Corporation, Bayonne, N. J., is using six-ton capacity trailers drawn by 2½-ton motor trucks for making large-quantity deliveries in territory near its plant. The particular outfit illustrated is loaded with 268 50-gal. steel drums. The overall

length of the trailer and truck is 51 ft., while the maximum width is 8 ft. and the height 11½ ft. The trailer was supplied by the Lapeer Semi-Trailer Co., Long Island City, N. Y., and the truck by the Mack International Motor Truck Corporation, Jersey City, N. J.



Aircraft Problems Discussed

Engine Production Facilities Now in Excess of Demand— Situation Favors Improvements in Product

IN a paper on "Recent Developments in Aircraft Engines," contributed to the fiftieth annual meeting of the American Society of Mechanical Engineers in New York last week, John H. Geisse, vice-president of engineering, Comet Engine Corporation, Madison, Wis., outlined briefly the status of production facilities and some of the recent technical developments.

"The most noteworthy event of the last year or two has been the number of new concerns that have entered or have become closely affiliated with this field and the tremendous expansion of production facilities on the part of the older companies," he said. "Outstanding among the new ones may be mentioned such well-known companies as the Continental Motors Corporation, Lycoming, E. W. Bliss Co., Le Blond, and the author's associates, the Gisholt Machine Co.

"Before considering the products of these companies, it will be interesting to look into the possible market for their wares. A little over a year ago there was a definite shortage of engines. The stock of war-surplus engines was rapidly dwindling, and with the increased demand the production facilities of the country were not equal to meeting the situation. This curtailed the production of planes, and the market was quite definitely a sellers' market. Under this condition it was quite easy, and perhaps quite natural, for the plane manufacturers to make rather broad statements of the number of planes they could sell if only they could secure the engines.

Probable Sales Less Than 7000

"The existing engine manufacturers, and many others who were not then manufacturing, were influenced by these optimistic statements and immediately took steps to provide against another shortage this year. How admirably they succeeded is evidenced by the fact that present production facilities far exceed any possible demand. Whereas the year started with plane sales predicted to exceed 14,000, the latest estimates place the probable year's sales at less than one-half of this figure. The actual engine production for the first six months of this year as reported by the Aeronautical Chamber of Commerce was 3275, and it is doubted whether this figure will be greatly exceeded in the present period. If it is doubled in this period, it will mean a production rate of not over 40 engines per day. In contrast to this it is very easy to total up claimed production facilities of over 100 per day, and each day brings news of new enterprises, all planning on going into production, at the rate of ten per day.

"It is not desired to paint a gloomy picture for the industry, but the author does want to impress the fact that there is no shortage in produc-

tion facilities for the time being, and that there is not likely to be another shortage in the immediate future. He confidently expects the industry to have a phenomenal growth and that the demand will catch up to production facilities, if the growth of the latter only will slow down to a saner rate.

"This rush to get into production has, to a considerable extent, held back engine development during the last year. Now that production facilities exceed the demand, developments will come along more rapidly. Not only will the engineers have more time to concentrate on improvements in their products, but competition will demand them."

The trend toward the "in-line" air-cooled types of engines was briefly discussed, as well as some of the advantages and disadvantages of the radial engine. Of the latter it was said that undoubtedly it will continue to be used by many manufacturers.

Cylinder construction comprising a steel sleeve having machined cooling fins and a cast-aluminum head screwed and shrunk on the sleeve was said to be almost general practice. In most cases the heads are cast of Y-alloy which retains a relatively high strength at elevated temperatures, giving about 26,000 lb. per sq. in. at 500 deg. Fahr.

Cylinders are generally machined from a 1050 S.A.E. heat-treated forging. "A new development of this year," said Mr. Geisse, "is the elimination of normalizing, and the re-heat treating of cylinder forgings. One prominent manufacturer is now securing his cylinder forgings with one heat treatment, which gives the desired Brinell hardness, but leaves a very coarse grain structure. The saving in heat-treatment cost is not very great, but the material in this condition is very much easier to machine than when normalized and re-heat treated to give the same Brinell hardness."

Heat-Treated Alloys for Crankcase

There was said to be a general trend toward the use of heat-treated alloys for the crankcase. The tensile strength of these alloys is from 30,000 to 40,000 lb. per sq. in., in the heat-treated condition as compared to about 20,000 lb. obtained from the more common No. 12 alloy. "Because of the limitations imposed by casting difficulties on minimum wall thickness and to the variations in wall thickness in the usual castings, which may adversely affect the heat treatment, all of this gain in strength cannot be utilized for weight reduction," said Mr. Geisse. "These considerations, along with the higher price of the castings, make the use of these alloys questionable in many cases. Use of forged crankcases is still limited, it is

believed, to Pratt & Whitney. Curtiss is using some magnesium castings, which permit a considerable saving in weight where strength is not required, but which are expensive."

Written discussion submitted by Robert Insley, vice-president Continental Aircraft Engine Co., Detroit, included the elimination of normalizing and re-heat treatment of cylinder barrel forgings. The author of the paper, it was pointed out, makes no comment on the effect of this process on physical properties. "Unquestionably this shortened process saves a few cents per forging, but it also definitely reduces the strength and wear resistance of the material," said Mr. Insley. Regarding the advisability of heat-treated aluminum castings for crankcases, Mr. Insley said: "It is true that in the unstressed wall sections the minimum thickness required for good casting properties affords sufficient strength in un-heat treated castings. In highly stressed parts, such as mounting bolt lugs, cylinder flanges, etc., the saving in weight possible in the heat-treated casting will well repay the slight additional cost."

In reference to the use of magnesium alloy castings, he pointed out that "the strength of the cast magnesium alloy is distinctly better than common aluminum casting alloys, approximately the same as the Y-alloy, and that the elongation is nearly twice that of the best aluminum alloy used for aircraft engine parts. The cost, piece for piece, is approximately 25 per cent higher than aluminum, which, together with the susceptibility to corrosion, has restricted use of this material."

Large Airplanes for Transportation

At the same session, which was held Dec. 6 under the auspices of the A.S.M.E. aeronautical division and presided over by C. H. Colvin, Pioneer Instrument Co., Brooklyn, N. Y., C. T. Porter, vice-president Keystone Aircraft Corporation, Bristol, Pa., presented a paper on "Factors in the Design of Commercial Airplanes."

An increasing market for air transportation, using the equipment as now developed, was said to lie in the more remote and inaccessible places where quick and cheap boat and rail transportation has not yet been provided. "However, this type of market will not supply the demand that the industry needs, and the aeronautical engineer must produce a product that can equal the speed, cost and comfort of the extra fare train," said Mr. Talbot.

"To be successful in competition with the extra fare trains the airplane designer must supply a combination of speed and comfort that will be sufficiently more appealing to the general public to justify the higher cost of air transport. With increase in the number of landing fields and improvement in airplane efficiency, there is no doubt that air transportation will play a prominent part in the economic life of the country."

Can Business Balance Be Attained?

Economic Equilibrium, Mergers, Optimum Size of Organization
and Satiability of Consumer Demand Are Discussed
at Taylor Society Meeting

INDUSTRIAL equilibrium, a subject that is now challenging the best brains of Government and business, was a leading topic at the annual meeting of the Taylor Society, held at Hotel Pennsylvania, New York, Dec. 4, 5 and 6. Mergers, the optimum size of organization, the preservation of individual initiative in large companies, controllable factors in management and the satiability of consumer demand were other questions discussed—all of them inspired by the report of the Hoover Committee on Recent Economic Changes.

Briefly, the purpose of the meeting was to interpret findings of the report both from the standpoint of its broad application to the problem attacked by the Washington conferences and from the angle of their bearing on the managerial policies of individual industries.

Are there practicable steps toward an industrial equilibrium? This question, thanks to President Hoover's conferences, is uppermost in the minds of the American people at the present time. Many are disposed to doubt the feasibility of current efforts to promote economic balance, lacking faith in what they call "palliatives" or "artificial stimulants," but others take a more hopeful view, although frankly admitting that the undertaking is an experiment.

No question could have been more timely for consideration by the Taylor Society and no more appropriate speaker could have been selected than Prof. Wesley C. Mitchell, director of the National Bureau of Economic Research, which prepared the fact-finding portion of the report on Recent Economic Changes.

Cites Progress Made Toward Stable Economy

PRACTICABLE steps toward equilibrium can be taken, Professor Mitchell believes, stating that various measures have already been tried to make the business engine run more evenly, as brought out in the report that he helped prepare. "Also I recognize that a further step of great technical interest is being tried at this moment on a national scale," he added. "While a business cycle is passing over from the phase of expansion to the phase of contraction, the President of the United States is organizing the economic forces of the country to check the threatened decline at the start, if possible. A more significant experiment in the technique of balance could not be devised.

"But whatever measure of success may attend President Hoover's effort, further steps toward industrial equilibrium must be taken in the future."

Professor Mitchell explained that equilibrium is not a static condition, but that throughout the complicated business dealings going on at any time there runs a gravitational pull toward balance. Equilibrium constantly tends to establish itself afresh whenever departures from it occur. But departures are to be expected and the abolition of such disturbances might check progress in per capita production and consumption.

"We attribute a great part of the mechanical progress of the last hundred years to the pressure which those who early adopted superior methods applied to their slower moving competitors," he said. "The desideratum seems to be a technique of balance which will permit cumulative changes, each of which disturbs

existing arrangements enough to secure the prompt adoption of improvements and keep everybody on his mettle, but a technique which will prevent these salutary irritants from developing into cancers.

"In other words, the aim is to reduce random, seasonal and cyclical fluctuations in economic activity, so far as that can be done without checking the rise of secular trends."

Gratifying progress in that direction has been made of late, according to Professor Mitchell. "The half-dozen years preceding 1929 combined moderation of cyclical fluctuations with acceleration in the rate at which per capita income grew. Doubtless circumstances which no man planned contributed to this outcome, but part of the result was due to human contrivance. Nor does any reason appear why, by the continued exercise of their inventive powers, men may not better the accomplishments of 1923-1928."

Rapid Liquidation Accelerated Recovery from 1921

THE bearing of industrial equilibrium on regularity of operations and of employment was the subject of a paper by Leo Wolman, member of the faculty of the New School for Social Research, New York, and also on the research staff of the National Bureau of Economic Research.

"If there is anything to the notion of balance and equilibrium," declared Mr. Wolman, "then the problem of securing industrial stability and regular employment consists in the early discovery of excesses in the industrial system and in the application of

measures of control. In principle such a procedure may appear simple; in practice it is surrounded with unusual difficulties—difficulties of fact and of analysis.

"It is not so long ago since disturbances in the economic system were regarded as self-corrective. The interesting question now is whether we have passed much beyond that stage; and the answer to the question seems to lie in our capacity to analyze the experience of the recent past. . . .

"While many factors no doubt contributed to the swift and unexpected turn of American business after the deep depression of 1920 and 1921, the single and most effective force was, in my judgment, the speed and completeness of the business and industrial liquidation of those years. . . . In place of a hesitant and prolonged adjustment of costs to a new condition, such as has characterized the history of the past 10 years of English industry, the American adjustment was drastic and decisive. What happened here was probably not the result of deliberate policy, but was due to the prevailing temper of the country manifested in an unusual mobility of both capital and labor.

"This fact of mobility or of elasticity which seems to me to be central in accounting for both the recovery of business and for the maintenance of high levels, once they have been achieved, has persisted in the subsequent post-war years. If anything its force has been enhanced. The rising general level of education in the country, the progressive mechanization of industry, the experi-

mental attitude of the industrial engineers and of the managers of industry, the cumulative application of invention, and the preoccupation of industry with the improvement of plant and equipment, have been the factors that have combined to accelerate the pace of our industry and to perpetuate the habit of frequent and universal change.

Automotive and Building Industries Were Stimulants

"ASSOCIATED with this pervasive, psychological attribute of our contemporary business situation are features that may well turn out to be more fundamental. . . . Of these the most significant appear to be the state of the efficiency of industry, the direction of the price level, the credit condition of the country, and the probabilities of further growth in the size of the market."

Mr. Wolman points out that since 1919 American industry has been characterized by a reduction in costs as a result of improved methods of management and invention. But the most striking changes in productivity took place largely in the so-called new industries—the automobile and collateral industries, the electrical and chemical industries. A question of great moment at present is whether these industries have reached a stage of retardation in which, for the time being at least, no further progressive reduction in costs can be looked for.

The construction industry has also been an important contributor to prosperity in the last eight years. If both construction and the automobile industries have "reached the end of their rope," Mr. Wolman believes that "we must depend for an accelerated pace upon the performance of some unknown new industry or upon technical revolutions in the old, established ones."

Although it seems impossible to explain what happened in terms of reduced costs in the building industry (Mr. Wolman adds that improvement on that score may have been greater than is realized), a downward movement of the price level at this juncture, if unaccompanied by further cost reduction, may "produce those consequences in shrinking profits that are often associated with the existence of industrial depression."

New Stimulus Must Be Found

In appraising the activity of recent years Mr. Wolman suggests that the use of consumers' credit in developing the automobile, radio and similar industries may prove to have been a species of slow, but effective, inflation. Likewise the financing of building construction during the boom years 1925 to 1928 may have been marked by inflationary practices.

When for such or other reasons important industries slacken, "the existing economy," Mr. Wolman says, "must look elsewhere for a new stimulus. The creation of this type of incentive to business is the purpose of the conferences now being

held in Washington and it may very well happen, within the next months, that the spur to business will come either out of the deliberations in Washington or from the discovery by a single industry of a new product or a variant of an old one."

See Greater Economic Coordination Ahead

"WE are challenged to control a billion horses more or less wild," declared Stuart Chase, Labor Bureau, New York, in picturing the problem of attaining industrial equilibrium. Pointing out that at least a billion horsepower has been loosed on the world since the day of James Watt, he declared that the greatest question facing us is, "Have we the intelligence collectively to control the machine age?"

It is conceivable that coordinated control is possible in a dictatorship like those in Italy or Russia, he said, but it is manifestly difficult of achievement in the United States with its system of free competition, "more or less diluted by mergers, to be sure."

Although admitting that the standard of living in Russia is still far below that in America, Mr. Chase suggested that there might still be some lessons for us in the Soviet experience. He related what he had learned in Russia about the Soviet program for the development of its economy. All industrial expansion is in the hands of a general economic staff. The Donetz coal basin and the Caucasus oil region are being exploited as single economic units. Overexpansion and wasteful methods of production can be and are avoided.

Available surplus capital in Russia is invested where careful study indicates that it is most needed. The first objective of the Soviet authorities was to bring industrial production back to the pre-war level by 1927. This goal was reached. The Government now has a five-year program to double production, at the same time reducing unit costs 35 per cent. For the first year (fiscal year ended October, 1929) the plan called for a 21 per cent increase in industrial production. The actual gain, said Mr. Chase, was 24.3 per cent.

In Russia's present program the accent is on producers' goods, particularly the building of steel plants and electric generating stations; just enough consumers' goods are being released to hold popular discontent in check. The Russian experiment in coordination, Mr. Chase added, is getting aid from this country in both equipment and technical personnel.

Believing that President Hoover has already inaugurated what is an approach to an economic general staff, Mr. Chase suggested that such a central body assisted by regional economic staffs—all of them purely advisory—might prove adapted to the needs of this country. Plans could be laid out for each region with an eye to the conservation of natural resources, and advice could be given on

the use of capital, thereby discouraging the overbuilding of plants as well as the expansion of others to meet actual needs. The use of credit, industrial decentralization, the pooling of extraordinary advances in the science of management, and the handling of technological unemployment would also be matters that could properly come within the scope of the work of such bodies, Mr. Chase said.

Statistics as an Aid to Equilibrium

ANOTHER plea for greater coordination, though of a different kind, was made by Prof. J. T. Madden, New York University. He pointed out that there are many independent Government fact-finding agencies whose efforts might be made more effective if pooled. Many facts uncovered, moreover, lack utility because they are not made available or are too incomplete. The statistics that offer the greatest possibilities, in Professor Madden's opinion, are the income tax returns. If complete returns were made available for study a year after collection, they would greatly help business men in controlling business. They would indicate the profitability of undertakings, and trends and tendencies in different lines of industry. If in addition information could be obtained on units sold, units produced, units in inventory, number of men employed, number of man-hours involved and wages paid, even more intelligent analysis would be possible. The additional burden of supplying such data might stir up some opposition, although Professor Madden was confident that it would not be insuperable, declaring that the significant thing about the American business man is that he is willing to try something new if he sees a possible benefit from it.

Professor Madden's suggestion, together with other proposals, were embodied in a resolution adopted by the Taylor Society for consideration by the President's conference. The resolution is published elsewhere.

A third discussor of the papers by Messrs. Mitchell and Wolman was Dr. Leonard Kuvin, chief statistician, Index Number Institute, New Haven, Conn. In his view the chief obstacle to industrial equilibrium is the present distribution of income. Funds that should reach the pockets of labor to nourish consumer demand are plowed back into unused plant and equipment.

Buying Power May Not Continue to Rise

THERE is nothing automatic about the gain in popular buying power, such as has characterized recent times, declared George Soule, associate editor, *New Republic*, speaking in another session. A further increase cannot be relied upon. In fact, the problem of mass purchasing power, in Mr. Soule's opinion, is one of the greatest uncertainties of our economic future in the next decade or two. It is a serious question,

he thinks, whether employers have consciously adopted the so-called doctrine of high wages and, if any of them individually have done so, whether such action has had much effect on business conditions generally. There was no appreciable growth of the purchasing power of wages between 1913 and 1919. The big boost came as a result of the 1920-1923 depression when prices fell more rapidly than wage rates. When employment increased after this depression the buying power of wages gained greatly. Since 1923, said Mr. Soule, there has been a further increase in purchasing power as a consequence of the rapid increase in production, although the gain has been small, the rise in wage earnings having been by no means so great as in the productivity of industry.

It is true, declared Mr. Soule, that

the individual employer will gain from a general increase in purchasing power, but it is not true that he will gain much by raising the buying power of his own plant. Outside of men of exceptional resources, like Mr. Ford, individual employers will pay wages that the labor market dictates. Moreover wages can't go up proportionately in all industries. Productivity increases much more rapidly in some lines than in others. Some whole industries are suffering from over capacity and cut-throat competition and in every industry there are marginal plants that can't pay higher wages. The only recourse, in Mr. Soule's view, is to rely on a reduction in the prices of commodities that will stand it to raise general buying power. He does not recommend a 1921 to bring this about, feeling that it will be the natural result of com-

petition. Even among non-competitive industries, such as utilities, the good sense of managements or of governmental regulating bodies should assure reductions of rates or prices.

Cites Change in Attitude Toward Unemployment

COMMENTING on Mr. Soule's belief that, generally, there has been no conscious adoption of the high wage doctrine, Edward Eyre Hunt, secretary of the President's Conference on Unemployment, who was presiding at the session in question, called attention to the marked difference in the attitude of industry toward labor today and immediately after the war. Nothing is more impressive at the present time than the widespread concern over the maintenance of employment.

Real Managerial Ability is Main Requisite for Successful Mergers

THE economic justification for mergers and the limits, if any, on the size of business organizations, were discussed from many angles in different sessions. A paper on the effect of consolidations on distribution expenses, by B. C. Milner, Jr., Ford, Bacon & Davis, New York, is published elsewhere. He emphasized the fact that dependence on mere size is futile—real managerial ability is the most important factor.

The importance of management was also emphasized by C. F. Hammond, Irving Trust Co., New York. Merging is not merely a matter of putting 2 and 2 together and getting 4. One can hitch two automobiles together, but the result will not be twice the speed. The large scale organization, declared Mr. Hammond, is relatively new and scientific management is even newer. To believe that there is a point beyond which a large-scale organization cannot expand without loss of efficiency is similar to accepting the Malthusian theory as final.

Size Depends on Standardization Possible

The size of a business is usually a function of standardization, according to Robert W. Burgess, chief statistician, Western Electric Co., New York, who presented a general analysis of the report on Recent Economic Changes, with emphasis on subjects of practical interest to management. He said in part:

"Standardization is associated with the large unit, individualization with the small. In fact, I should like to suggest that the possibility of an effective large unit depends on the possibility of sufficient standardization of work to be done to permit statistical control. To bring out my point here, consider the possibilities of construct-

ing a country-wide organization for operating in real estate. I do not see how a standard report could be devised by which the central administration could tell whether an operator in a distant town had taken proper advantage of the existing opportunities for the purchase and sale of farms, stores, dwellings and vacant lots."

Despite the importance of statistics to the operation of a large-scale organization, statistics are a minor factor in determining the advisability of a consolidation. Mr. Burgess said, in part:

"The difficulty is that the most pertinent material does not get published in statistical form. I believe more light on this particular question would come from a frank discussion under the auspices of a group such as the Taylor Society, in which various insiders could make generalizations without stating specifically for record that bank A resulting from a merger is carrying quite a load of superfluous vice-presidents but does not have on its staff the first-class specialist in foreign exchange that it really needs, that industrial merger B is proving very successful because price-cutting millionaire X is now inside the fold and can be restrained from doing harm, that merger C of electric light and power plants will have to pass through a long seasoning period because several plants were acquired at a very optimistic valuation and because considerable employee and community ill will was created by the ruthless discharge of superfluous engineers and executives.

Conditions for a Successful Consolidation

"After a series of frank discussions it might be possible to formulate the conditions for a successful merger

along some such lines as the following:

- a. "The units merged must form a logical economic entity, which will really gain by having a common general staff, common operating methods, a common sales force and/or a common purchasing department.
- b. "The financial basis of mergers must not involve fixed interest obligations in excess of developed earning power.
- c. "The directors and principal officers of the merger must know their business, with enough grasp of changing economic factors to adjust their policies to current developments.
- d. "The merger must secure a high-grade general staff to formulate plans and methods. If the officers and employees of the merged companies do not contain such men, they must be secured elsewhere; some of them, at least, should have familiarity with the business.
- e. "The merger must show an obvious improvement in service before it raises its prices.
- f. "All former employees of the merged units must be treated equitably.
- g. "The merged concern must have good luck as respects such items as fluctuations in the prices of their raw materials and in consumer demand for their product, deaths of the principal officers, earthquake, fire, pestilence and stock market panics."

J. B. Swinney, Special Stores Association, New York, in addressing himself to the subject of mergers, said it was questionable whether they were warranted from the standpoint of any economies achieved in distribution. In retail trade, particularly, individual initiative is highly important. He quoted an old saying that "any business is the length and breadth of the shadow of some individual."

Ralph Borsodi, author of "This Distribution Age," declared that gains from size are confined very largely to production. He said there was something comic about the fact

that constantly decreasing costs of production are being lost in steadily rising costs of distribution.

Functionalization as Related to Size

In discussing whether there is an optimum size of organization, John H. Williams, consulting engineer, New York, said that the answer was mainly one of time. What was true 10 years ago is not true today, and what is true today will not be true 10 years hence. In his opinion, the size of an organization depends to a large degree on the extent that authority can be functionalized. Proper accounting can be made a great aid

Qualitative control fixes policies and the directions in which an organization is to grow and calls for a catalytic type of mind.

Compromise Between Functionalized and Unified Authority

That complete functionalization is not as practical as a compromise between a functionalized responsibility and unified authority was contended by Malcolm C. Rorty, vice-president, International Telephone & Telegraph Corporation, New York, in a paper entitled "To What Extent Can Large Groups Be Organized and Managed to Realize the Abilities, Capacities

automobile industry. If consumers' wants are limited, that fact must be taken into account in estimating the scope of future decreases in operating costs in lines which have been depending for economies on a rising volume of business.

"For many years economists have taught that consumers' wants are without limits," said Paul H. Nystrom, professor of marketing, School of Business, Columbia University, New York, "but this statement has rarely, if ever, been interpreted as meaning that consumers' wants for particular goods are insatiable. Economists have had *general* rather than *particular* consumer demand in view. They have merely called attention to the fact of common knowledge that when certain consumer wants are satisfied others arise. As these are satisfied still others arise and so on indefinitely.

"The suggestion that consumer wants for particular goods are insatiable is contrary to ordinary common sense and every-day observation. Consider your own households. Are the wants of the members of your household insatiable? Are there no definite limits to the amount of food desired? Is there any particularly desirable item for which there exists no point of satiety? Are there no limits to the wants for clothing? For fuel and light? For furnishings and other commodities? If your wants and those of your immediate household are limited for any specific commodity, then is it not reasonable to assume that consumer demand generally, which is but a composite of individual wants, is definitely limited for every particular kind of goods?"

In discussing Mr. Nystrom's paper, Austin Donaldson, general manager, Gimbel Brothers, Inc., New York, emphasized the fact that society is in a dynamic and not a static state. We must expect motion, action, change, variation. From a practical point of view the individual business can rightfully hope to get part of the share of total trade now going to another business. It is true that the stomach can hold only a fixed amount of food, but management is not concerned about that, but rather about the variety of food that can be put into the stomach, replacing a 50c. meal with a \$1 meal. What is the high limit of consumer demand today is a low one tomorrow.

Percy S. Straus, vice-president, R. H. Macy & Co., Inc., New York, who was presiding, made the point that it is difficult to ascertain at any one time whether satiety has been reached in a given product. The problem is limited by so many variables that results of investigation are very unsatisfactory. Prices, it has been found, are frequently an important factor. A product that has reached the point of satiety at one price may prove to have a much higher limit at a lower price.

The problem of business balance and regularity of employment raises the question whether the individual

Taylor Society Resolution Offers Suggestions

Whereas, the President of the United States has called a conference of business leaders for the purpose of making plans to promote business stability and prevent unemployment,

Be it resolved, by the members of the Taylor Society, in annual meeting assembled, that the following recommendations be forwarded to the President's conference:

First, since a fundamental factor essential to industrial equilibrium and prosperity is the prevention of wide fluctuations in the general level of commodity prices, we recommend that the conference express its appreciation of the actions already taken by the Federal Reserve System to this end, and that the conference recommend to the Federal Reserve Board that, as a means of reassuring business, they make open avowal of their intention to observe this policy in the future, so far as possible.

Second, since the Government is in possession of much valuable data, contained in the archives of

the Treasury Department, the Department of Commerce, and elsewhere, which would be of inestimable value to business, if analyzed and summarized and the results made public, we recommend that the conference propose a plan whereby this information shall be made available to business in such form as not to violate the confidential character of the constituent data.

Third, since many industries are suffering from unbalanced production and other maladjustments, which are harmful to all concerned, including capital and labor, producers and consumers, and since the Department of Commerce, through the Bureau of Standards and the Division of Simplified Practice, has already pointed the way to a form of coordination within each industry which preserves to the public the benefits of competition, we recommend that the conference evolve plans whereby such coordination may be extended into other fields and phases of business and industry.

in visualizing management in terms of the responsibilities into which a business is broken up. Such accounting would make it possible to make incentives effective. Each executive having authority over a certain functionalized activity would have the work under his control measured.

Richard A. Feiss, business consultant, Boston, agreed with Mr. Williams on the importance of functionalization but made the reservation that a good boss with vision is still necessary. Decentralization for action on functionalized responsibilities must be coupled with centralized control. Walter Rautenstrauch, professor of industrial engineering, Columbia University, New York, also pointed out the need for these dual factors in the organization, calling them qualitative and quantitative control.

and Energetic Efforts of an Individual as Though He Were in a Small Business of His Own?" A liberal abstract will be published in a subsequent issue of THE IRON AGE.

H. A. Hopf, H. A. Hopf & Co., New York, emphasized the personal side of the problem of size, saying that when it is found that decisions are unduly delayed or initiative is stifled, then at that point the optimum size of an organization has been reached.

Consumers' Wants for Particular Goods Limited

A SUBJECT closely tied up with business equilibrium is the growth of consumers' wants. The possibility of producing en masse has been a major factor in paving the way for sharp reductions in unit costs of manufacture, as for example in the

employer can contribute to its solution. To what extent can he control his business? This question was discussed in detail in a paper by Howard Coonley, president, Walworth Co., Boston. He stated that there are no wholly controllable factors in management, but listed a number that are largely controllable.

Every executive controls materials, although he does not always do it effectively or scientifically. Likewise, labor is assigned to individual departments and to individual jobs. A policy can be set up to govern the great majority of conditions that arise within the field of administration. After all such a policy is merely an economical device for specifying uniform procedures governing repetitive situations. Although volume of sales cannot be included among controllable factors, expenses can be controlled and indirectly influence sales volume and price.

A sales budget cannot be listed as controllable, since intelligent estimating dips into fields where conditions are most variable. But it is surprising, according to Mr. Coonley, with what accuracy intelligent conclusions can be reached in fields that first seem unexplorable. Once the step is taken it is found that possibilities prove probabilities, and probabilities turn into actualities. With a moderately accurate sales estimate, a production program can be established and controlled and the problems of uneven production counteracted with a consequent improvement in efficiency and labor turnover.

Among the uncontrollable items Mr. Coonley listed sales. In estimating sales there is always the difficulty of setting standards for purchases that are made to cover price advances or to insure against a probable shortage. Sporadic demand for slow-moving articles also complicates the machinery of control, since rapid turnover of inventory is not possible.

The labor market is highly seasonal and the productivity of labor is difficult to handle. The financing of business may be planned but cannot be absolutely controlled. Control of marketing is impossible, but offers a fertile field for research. Competitive cooperation may do away with unfair practices, but still holds great dangers that should be carefully guarded against.

Psychology is the most evident of uncontrollable factors. The executive who can gain the confidence and affection of his employees can capitalize this in definite economies.

In discussing Mr. Coonley's paper, F. A. Silcox, New York Employing Printers Association, Inc., said that there are controllable factors even in psychology. Professor Rautenstrauch agreed that there are certain fundamental psychological principles which can be used. One should get firmly in mind, he said, that man cannot make laws, but can conform to laws. There are laws of society and human nature. Our problem is to study the laws of human nature and the laws

of conduct. He cited Tammany Hall as an example of control of a great mass of people through psychology.

Employer-Employee Cooperation

HOW employees and employer have cooperated in the interests of scientific management was described in papers presented by J. Foster Smith, agent, Naumkeag Steam Cotton Co., and John P. O'Connell, secretary and business agent, local union No. 33, United Textile Workers of America. Because of conditions in the industry the company was confronted with the necessity of further reducing costs. It presented a proposition to its employees that called for a reapportionment of jobs and the elimination of certain operations, but not the reduction of wages. The employees on their own initiative consulted a management engineer, in the hope that a more satisfactory readjustment could be worked out. As a consequence the company retained this engineer for a thorough study of the plant and the employees are cooperating in efforts to bring about improvements in methods.

In commenting on this experiment Miss Frances Perkins, industrial commissioner, State of New York, said that the important question is whether it is of special or general significance. If it points the way to methods of arousing the interest of the workers in their jobs, it is a great step forward. We live in a machine age and we are challenged to make it an industrial civilization. In the days of the medieval guilds when craftsmen had a wholehearted interest in their vocations and vied with one another in putting skill and art into their work, Europe had an industrial civilization. Greater understanding on the part of workers of their share in the control of our great industrial machine should fire their imagination and add the spice of interest and incentive to work that they too frequently look upon as drudgery.

New Officers

Henry P. Kendall, Kendall Co., Boston, was reelected president of the Taylor Society, and John G. Aldrich, New England Butt Co., Providence, R. I., was elected vice-president to succeed George D. Babcock, Asheville, N. C. Henry Bruere, Bowery Savings Bank, New York, holds over as vice-president. Edward W. Clark, 3d, E. W. Clark & Co., Philadelphia, was reelected treasurer, and Dr. Harlow S. Person was renamed managing director. New directors include Louise C. Odencrantz, executive secretary, Employment Center for the Handicapped, New York, and John M. Carmody, McGraw-Hill Publishing Co., Chicago.

Foreign Trends Discussed at Dinner

ADDRESSES describing the progress of the management movement in Western Europe, England and Japan, were given at the dinner, Dec. 5, by members of the Taylor Society, who had visited these countries

in the past year. Henry P. Kendall presided and he and Morris L. Cooke, consulting engineer, Philadelphia, briefly described the recent international congress in Paris.

After seven months in England, during which she visited many of the larger and more progressive plants, Mary B. Gilson, Industrial Relations Counselors, New York, found that the English manufacturer is far from being as unprogressive as is often believed. Much of this impression, she pointed out, has doubtless developed from his unwillingness to talk about himself, or gather with other manufacturers to discuss subjects of common interest.

Victor Karabas, University of Pennsylvania, gave a few impressions gained from traveling through 17 countries and visiting many manufacturing plants in each. While the scientifically managed European plant is quite as well operated as the better companies in the United States, perhaps largely due to the fact that many of the executives have been trained by working in the United States, he said that there is a much wider gap in Europe between the well-managed plant and the ordinary small company.

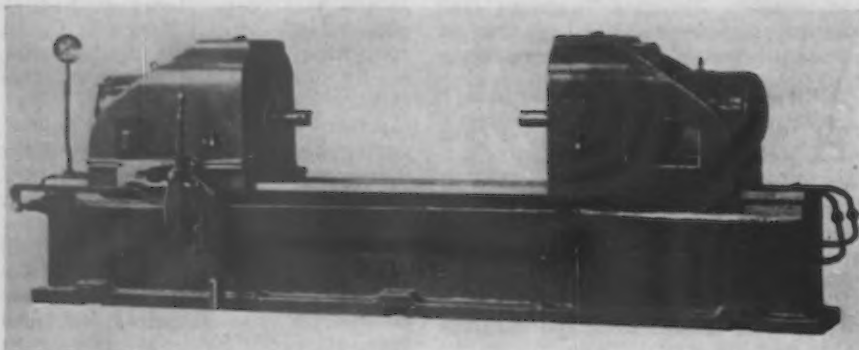
The meetings of the International Industrial Relations Association in Bavaria were briefly summarized by Mary Van Kleeck, Russell Sage Foundation, New York, who pointed out the difficulty of realizing the wide difference in economic conditions faced by various countries of Europe, except at a meeting such as the one held in Bavaria.

A visit to Japan by King Hathaway, consulting engineer, New York, resulted in an unexpected lecture tour by him. The Japanese expressed great interest in scientific management, but appeared to be unnecessarily intent upon expanding their foreign outlets for manufactured goods. He pointed out to many of them the great potential market they had among their own people, which could only be developed through reducing production costs by better methods, although not by the immediate introduction of quantity-production machinery, which would tend to produce too much unemployment.

Barton Rolling Mill Is Sold by Receiver

The Scott-Weiss Steel Co., 110 South Dearborn Street, Chicago, broker in iron and steel products, plants and equipment, has purchased at a receivership sale the plant and equipment of the former Barton Steel Co., 3426 South Kedzie Street, Chicago. Prior to its receivership, the Barton company was a producer of reinforcing bars.

The plant, which is a comparatively new development, consists of four acres of ground, a rolling mill, a one-story structure 98 x 600 ft., warehouse 100 x 400 ft., and a combination office and warehouse.



Two-Way Opposed Boring and Reaming Machine

FOR production work in the manufacture of automobile parts, gas engines, tractors, transmission cases and for other boring and reaming operations or for use as a power unit for driving multiple-spindle drilling heads, a two-way opposed horizontal boring and reaming machine has been brought out by the Defiance Machine Works, Defiance, Ohio. The base of the machine is heavy and rigid, has a cored center and heavy

and wide broad ways on which the heads slide. The ways are planed over the entire length of the base providing a center between the heads true and suitable for mounting and clamping a work holding fixture. The base is built in length to suit requirements.

The machine illustrated has single spindle head but heads with any diameter spindle or with as many spindles as desired can be furnished.

The spindles are of heat-treated alloy steel and run in anti-friction or bronze bearings. Heads are entirely enclosed and have stub tooth gears and splash or force feed lubrication. The minimum distance between nose of spindles is 29½ in. and the maximum distance with heads open is 57½ in. The height from top of ways to center of spindles is 12 in. The machine is equipped with Oilgear pump for feed or can be supplied with mechanical feed having rapid approach to the work, then desired rate of speed, dwell for facing, automatic kick-off and rapid return movement.

The length of the bed, diameter and height of spindle centers, number of spindles in each head and fixture are determined to suit the requirements of the customer. Motor specifications, giving horse power and speeds, must be determined, being dependent upon the work to be handled. For driving the heads the motors are attached to the drive spindles. The Oilgear pump is driven with a separate motor. The machine occupies a floor space of 13 ft. 10 in. x 55 in. and the net weight is 9710 lb.

Two Mammoth Metal-Working Machines

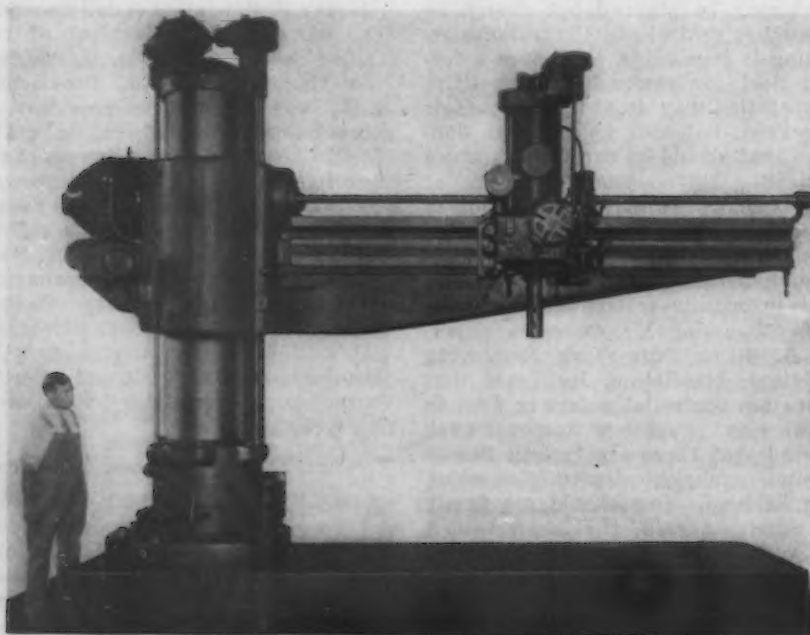
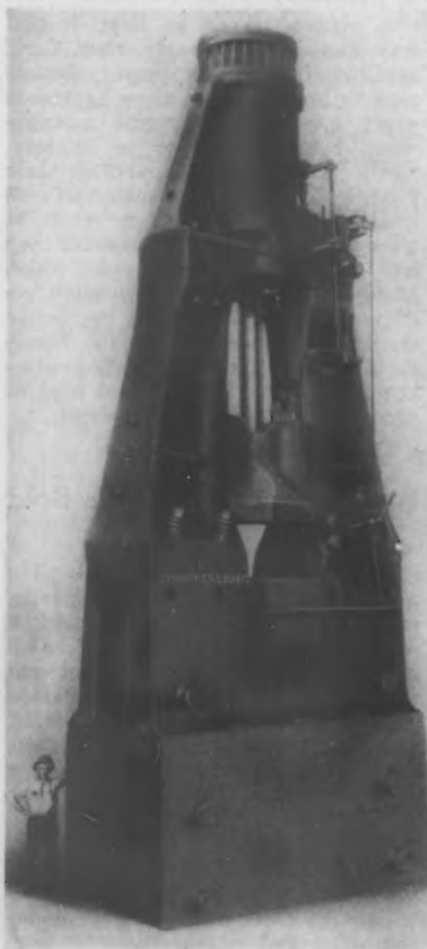
FOR the Fiat automobile company's Milan, Italy, works the Chambersburg Engineering Co., Chambersburg, Pa., has completed the large steam drop hammer shown at the left.

Although of standard Chambers-

burg design, the machine is unusual in some of its dimensions. It has a falling weight of 24,000 lb. with a cylinder bore of 32 in. and a stroke of 52 in. The diameter of the steam line is 7 in. and that of the exhaust line 9 in. The distance between the guides is 42 in., and the ram measures 66 in. from front to back. The guides are of the same type as those of the company's latest board drop hammer, the model H, and because of the length of work for which the machine is intended they were made extra wide. The overall height of the hammer, from the bottom of its three-piece anvil to the top of the head, is 34 ft. 10 in.; the height from the floor

line is 24 ft. 4½ in. The weight of the anvil, which was made in three pieces to facilitate shipping, is 482,000 lb., while the weight of the upper section of the anvil alone is 222,000 lb. The weight of the complete machine is 662,000 lb.

OF unusual proportions also is the 12-ft. arm 26-in. column radial drill below, which was built recently by the Cincinnati Bickford Tool Co., Oakley, Cincinnati, for a manufacturer of heavy machinery. The machine was equipped with a variable-speed motor mounted on the arm as shown. Features include rapid traverse, power clamping, and electrical control of arm elevating and clamping from the head.



New Large Rotary Grinder

Machine Resembling Boring Mill Is Adapted for External and Internal, as Well as Surface, Grinding

A 108-IN. rotary grinder for grinding outside and inside cylinders and cones, as well as flat surfaces, has been built by the G. A. Gray Co., Cincinnati, for the Chicago Heights, Ill., plant of the American Manganese Steel Co. In general appearance, the machine resembles a large boring mill, the grinding wheels taking the place of the boring mill cutting tools.

The work table is driven by a 5-hp. variable-speed totally-enclosed motor. Two hand levers give four changes of speed, while immediately over these levers is a rheostat which controls the speed of the table drive motor. There is available a wide range of table speeds. The housings are massive and are designed to carry heavy saddles for additional grinding heads, if necessary. They are bolted to the bed of the machine and joined at the top by a rigid brace carrying the gearing and motor which operate the rail elevating and rapid traverse mechanism. The cross-rail, which is similar to a boring mill rail, carries the right and left-hand saddles. On each saddle is mounted a swivel which can, by means of a worm and wheel, be swiveled to any desired angle for the purpose of grinding outside or inside cones. In the swivel are fixed two adjustable bronze bushings in which the spindle rams slide.

Spindle rams are heavy steel forgings which are accurately ground to a uniform diameter. One side of the ram is keywayed to a slight depth to receive the traversing rack, which also acts as a key in the swivel to resist the turning moment produced by the grinding wheel pressure. At the up-

per end of each ram is secured a flange to which is bolted a 25-hp., 1000-2500-r.p.m. adjustable-speed motor adjusted for dynamic balance. The motor shaft is connected to the wheel spindle by a flexible coupling, and the upper end of the wheel spindle turns in a precision-type ball bearing, while the lower end turns in a pair of precision Timken bearings. The wheel spindle, which is about 6 ft. long, is a heat-treated alloy steel forging with a hardened nose. The spindle and motor armature are so well balanced and rigidly mounted that with the motor running at its highest speed, no vibration or noise can be detected except the rush of the air through the motor armature and around the wheel. To the lower end of the spindle ram is bolted a steel flange to which various types of wheel-guards may be attached. Each spindle is provided with a counterweight, which can be adjusted in amount to suit the weight of the wheel or other attachments, and the inclination of the ram.

Right-Angle Attachment Permits Grinding Flat Surfaces

When the grinding wheels are mounted directly on the main spindle they may be used to grind inside and outside cylinders and cones. For grinding cones the heads are swiveled to the desired angle. When the right-angle attachment is used the machine can grind only flat horizontal surfaces. The wheel then revolves in a vertical plane and grinds on the edge.

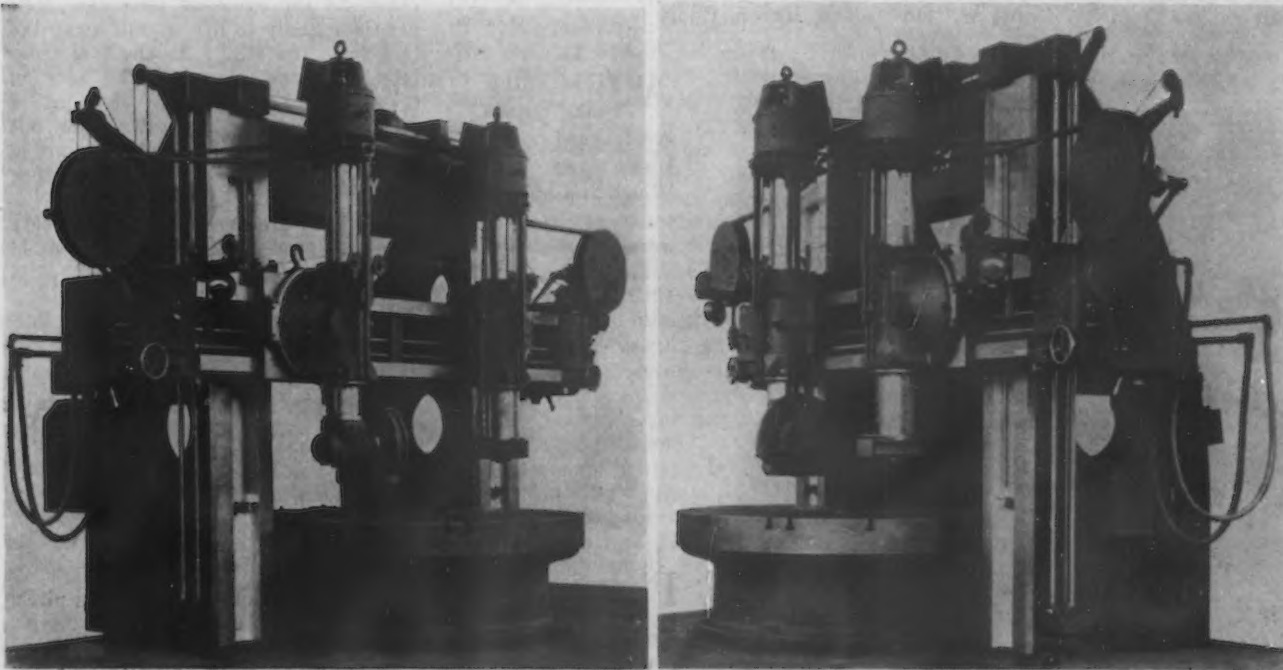
The saddle is traversed along the

rail by means of a heavy rail screw, which may be turned manually by means of a large crank. Immediately over this screw is a feed rod which rotates the rack pinion by means of a worm drive.

On the top brace is a motor which drives the rapid traverse mechanism. From the gear box at the end of the rail project three handles. One of these handles controls the rapid traverse for moving the saddle along the rail. When the handle is depressed the saddle rapidly traverses toward the operator. As soon as the handle is brought back to its mid position the saddle stops. When the handle is raised the saddle traverses away from the operator, and stops traversing as soon as the handle is returned to its mid position. The second handle controls the movement of the ram in a similar way, the ram traversing in the direction that the handle is pushed. The third handle controls the raising and lowering of the rail.

Sixteen Traverse Feeds and 12 Infeeds

Within the large gear case at the end of the rail, and covered by a swinging aluminum door, are change gears operating the traverse feed and infeed. Two levers provided on the front of the gear case are interlocked in such a way that when this traverse feed is connected to the feed rod, so that the ram traverses for the purpose of grinding a cone or cylinder, the infeed mechanism is coupled to the saddle screw. The change gears furnished provide 16 rates of traverse feed, ranging from $\frac{1}{4}$ in. to 2 in. per revolution of the table, and 12 different infeeds from 0.00025 in. to 0.004 in. per traverse. The feed mechanism is arranged so that whenever the ram reaches its lowest or highest position the infeed becomes operative, the rail screw rotates



Bed, Table, Housings and Rail of This 108-In. Rotary Grinder Are Similar to Those of a Boring Mill. Arrangement of the spindle ram and spindle drive and use of electrical interlocks and other safety devices are among the features

slightly and the wheel is moved into the work the desired amount.

To fix the limits of motion of the ram in the swivel (or of the saddle along the rail) and to reverse the direction of the traverse feed at the end of the traverse, a circular plate is provided which revolves in unison with the movement of the traversing member. On this plate are adjustably mounted two dogs which operate a trip mechanism. The trip mechanism in turn releases an escapement which permits a torque motor to operate the traverse feed reverse mechanism. Each time that a dog strikes the trip mechanism, the direction of travel automatically reverses. If the rapid traverse is used and the ram moved above the upper limit of its travel, it automatically returns as soon as the feed is thrown in.

The pieces to be ground in this machine are large, the material is hard and tough and the wheels wear much more rapidly than they would on a weaker or softer material. In consequence of this, the diameter of the wheel is reduced appreciably during the traverse, so that the depth of cut at the end of the traverse is only a small fraction of the infeed,

which is the depth of cut at the beginning of the traverse. To compensate for this wheel wear, a differential mechanism is introduced into the infeed train. This is driven by a small electric motor through a speed changing mechanism. A knob projecting from the front at the bottom of the gear case on the end of the rail adjusts this mechanism so that any desired continuous feed (for the purpose of compensating for wheel wear) can be superimposed on the infeed which occurs at the beginning of each traverse movement.

To enable the operator to adjust this compensating feed correctly, each wheel motor is provided with an ammeter which is supported by the counterweight bracket. The compensating feed is so regulated that the power taken by the motor will remain constant during the entire traverse, indicating a constant depth of cut.

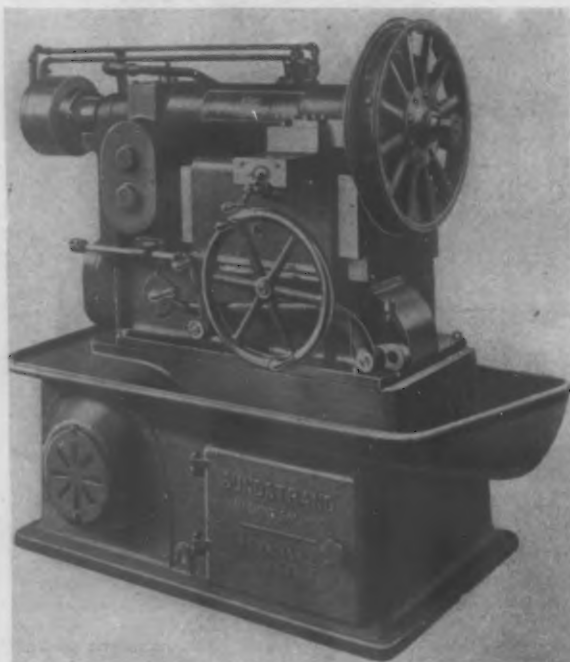
Other interesting features of the machine are the electrical interlocks and safety devices which prevent the action of the feeds when the wheel is not rotating and which make it possible to instantly stop all motors by pushing any one of a number of emergency buttons conveniently located.

Lathe for Automobile Brake Drums

BRAKE drum stub lathes designed for turning automobile brake drums after they have been mounted on wheels, and for other work of this general character, are being built by the Sundstrand Machine Tool Co., Rockford, Ill. Twelve spindle speeds, ranging from 40 to 265 r.p.m., and ten feeds, ranging from 0.005 to 0.046 in., are obtainable. The longitudinal travel of the front and rear carriages is 6 in. and the longitudinal adjustment of the rear carriage is 1½ in. Transverse adjustment of front and rear tools ranges from 3% to 6¼ in. Mo-

tor sizes recommended are 5 to 7½ hp., 1800 r.p.m. The floor space required is 45½ x 60 in. and the approximate shipping weight is 3500 lb.

R. T. Monahan, 1525 Arcade Building, St. Louis, is now in charge of the sales and servicing of Geometric self-opening die heads, collapsing taps and threading machines in eastern Missouri, southern Illinois, Arkansas and Oklahoma. These products are manufactured by the Geometric Tool Co., New Haven, Conn.



AUTOMOBILE Brake Drums Are Turned on the Lathe at Left, Which Is a Modification of the Sundstrand Stub Lathe

Meter Service Breaker Can Be Set Easily

A CIRCUIT breaker designed to prevent blown fuses and difficulty in locating them has been put on the market by the Square D Co., Detroit. It is arranged for a quicker make-and-break so as to banish contact burning and variable action. The front operating handle is insulated against shock to the operator.

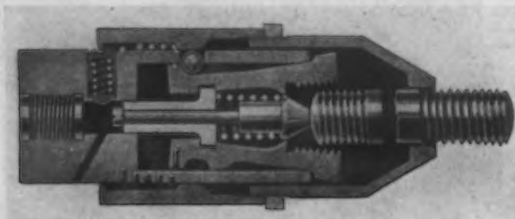
This handle indicates the on, off and tripped positions and can be locked or sealed. It is operated by a toggle and can be reset easily. The box is of the customary size. The circuit-breaking mechanism itself is sealed inside the insulating cover for protection against both tampering and dirt. This unit is made for 30-amp., 125-volt, 2-wire service.

Power-Driven Stud Setter With Quick Release

FOR use on all types of drill presses and on portable pneumatic and electric drills the Titan Tool Co., Erie, Pa., has brought out a self-opening type stud setter that will work efficiently at either high or low speeds and at any angle. Although positively driven, the studs are released automatically when driven to a predetermined height, and the seated studs are free from burred threads.

In operation the tool may be registered or loaded by clamping on to studs previously started in their seat by hand, or by inserting studs in the tool. The positive drive is released when the gage sleeve pushes back the slip ring, which in turn releases hardened steel driving balls. These balls move outwardly into a recess provided in the slip ring. At this stage, the driving jaws remain in complete register with the stud; and to further complete the cycle of operation it is necessary only to lift or pull away the tool from the stud. As the tool frees from the stud, the slip ring acts on the driving balls, forcing them into a driving position. The jaws come out into an open position and the unit is ready to register and drive another stud.

The jaws are arranged to fit closely over the stud, even where the studs



IN the Stud Setter at Right, the Drive Is Released Automatically When the Stud Is Driven

may vary as much as 0.015 in. in pitch diameter. Studs as short as ½-in. may be seated with this tool, which is made in two sizes, having maximum capacities of ½ and ¾-in. respectively.

National Steel Merger Is Completed

New Corporation Became Operative Dec. 4 with Election of Officers—Ingot Capacity 2,000,000 Tons

THE National Steel Corporation, recently formed by a merger of the Weirton Steel Co., Weirton, W. Va., the Great Lakes Steel Corporation, Detroit, and ore mining and blast furnace subsidiaries of the M. A. Hanna Co., Cleveland, became operative on Dec. 4 with a formal meeting of the directors at Pittsburgh. Officers elected at this meeting were: Ernest T. Weir, chairman Weirton Steel Co., chairman of the board; George R. Fink, president Great Lakes Steel Corporation, president; George M. Humphrey, president M. A. Hanna Co., chairman of the executive committee, and F. M. Hesse, treasurer of the Weirton company, secretary and treasurer.

Directors Also Elected

The executive committee consists of the first three officers, who serve also as directors. Other directors are Charles M. Thorp of the law firm of Thorp, Bostwick, Stewart & Reed, Pittsburgh; E. W. Mudge of E. W. Mudge & Co., Pittsburgh; J. C. Williams, president of the Weirton company; F. W. Blair, president of the Union Trust Co., Detroit; Carlton M. Higbie, chairman of Keene, Higbie & Co., Detroit; Howard M. Hanna, chairman of the M. A. Hanna Co.; C. A. Collins, president of the Hanna Furnace Co., Cleveland, and Isaac W. Frank, chairman of the executive committee United Engineering & Foundry Co., Pittsburgh.

Operations of the National company began Dec. 1 with the taking over of control of Weirton and Great Lakes properties and the Hanna subsidiaries. Depositing of Weirton and Hanna stock for exchange with National Steel has been going on for some time. Great Lakes holders will exchange their subscriptions for part paid National Steel receipts, paying out the balance Jan. 31 and Feb. 28, 1930. Temporary stock certificates of the new company are to be ready within a few days, and it is expected that the issue will be listed on the New York Curb market promptly.

Ingot Capacity 2,000,000 Tons

Consummation of this merger effects a completely integrated steel producing unit which, with the completion of previously announced expansion at Weirton and the inauguration of the new Great Lakes company plant at Detroit, will have an annual producing capacity of 3,500,000 tons of iron ore, 1,750,000 tons of pig iron and 2,000,000 tons of steel ingots, with a great diversity of finishing capacity. It will rank as the sixth largest producer of steel in the United States. No changes in executive personnel will be made, active direction of the three companies continuing under present guidance, sub-

ject to the executive committee of the National Steel Corporation.

A preliminary balance sheet for the consolidation reveals a financial set-up with total assets of \$119,982,007.94 and current assets having a ratio of better than 2½ to 1 of current liabilities. Property account, less \$37,288,850 for depreciation and depletion, is listed at \$64,867,639. Liabilities include bonds on subsidiary companies listed at \$10,370,891. The company has no funded indebtedness of its own, but assumes a mortgage indebtedness covering only the properties of its subsidiaries in Buffalo and certain coal interests. It has no preferred stock or other prior securities, the entire equity being represented by 2,072,000 shares of common stock of no par value, which are listed in the company's balance sheet at \$51,800,000. Surplus amounts to \$40,903,731. Properties appraised by H. A. Brassert & Co., Chicago, at \$143,715,000, in connection with the working out of the consolidation, are carried in the property and investment accounts of the balance sheet at less than \$77,000,000. This conservative value results from a combination of the depreciated book values of the companies involved, which have been operated over a long period of years on a conservative basis.

M. A. Hanna Co. to Fund Back Dividends

A plan for the funding of accumulated first preferred stock dividends of the M. A. Hanna Co., Cleveland, is being contemplated. No dividends were paid on this stock from the last quarter of 1925 to the first quarter of 1929, making accumulated unpaid dividends of \$24.50 per share. Current dividends were resumed in March, 1929, and have been paid regularly since.

Letters are being mailed to stockholders by the company, outlining the proposed plan, and calling a meeting for Dec. 30 at Cleveland for its consideration. It is understood the plan contemplates authorizing 200,000 shares of no-par \$7 cumulative preferred stock, of which about 140,000 shares will be issued at once in exchange for the present first preferred stock on a share for share basis, and to provide funds for payment of the accumulated dividend.

Arrangements have been made by the company to have a sufficient amount of the new stock underwritten at the rate of \$90 a share to pay the accumulated dividend. The company is offering to all preferred stockholders who exchange one share of their present stock for one share of the new stock the privilege of receiving in addition either 27/100 of one share of the new \$7 cumulative

preferred stock, which is at the rate of the underwriting price of \$90 a share, or taking \$24.50 in cash.

Through participation of some of its subsidiaries in the National Steel Corporation, the position of the Hanna company's preference stock owners is strengthened considerably. The National Steel Corporation will tend to stabilize Hanna earnings through greater diversification. Instead of relying almost entirely upon the conditions of the raw materials markets, Hanna stockholders will benefit from the earnings of the holding company as derived from finished steel income through its interest in the National Steel Corporation.

Funded debt of the Hanna company has been reduced almost 50 per cent by the National Steel Corporation assuming the bonds of the Producers Steamship Co. and the Buffalo Union Furnace Co., two of the Hanna subsidiaries entering the merger. Elimination of these bonds as direct obligations of the Hanna company has reduced almost by half the annual interest charges of \$600,000. Wiping out the accumulated dividends on the first preferred eliminates cash obligation of the company to its stockholders of about \$2,700,000.

James A. Campbell Not Opposed to Merger

When asked whether his relinquishment of the presidency of the Youngstown Sheet & Tube Co., to become the chairman of the board had any bearing on the possible inclusion of the Sheet and Tube company in a merger of independent steel companies, James A. Campbell said that the fundamental policy of the company he heads will not be changed.

At the same time Mr. Campbell stated that he was not opposed to an independent steel merger, but that, if the Sheet and Tube Company were to be taken in, it must be on a basis that would be fair to its stockholders and employees. He also said that he would continue to direct the shaping of the company's policies.

Mr. Campbell's statement received wide attention because it has been generally understood that he had been opposed to the absorption of the Youngstown Sheet & Tube Co., in a large grouping of independent steel companies.

Since the failure of the negotiations two years ago for a merger of the Inland Steel Co., and the Youngstown Sheet & Tube Co., the latter company has been frequently mentioned, but apparently without official authority, as likely to become a part of the steel merger plans of the Otis & Co.-Eaton-Mather group of Cleveland.

Increased production of the Gardner-Denver Co. will be in effect shortly, when machinery will be installed in a new plant addition at Quincy, Ill. Unfilled orders have been on an upward trend for the past several months.

Flexibility Needed in Materials Handling

Variety of Materials, Unit Sizes, Shapes of Packages, Distance and Route Covered Make Severe Problems

HANDLING any material from any part of a large plant to any other place within the fence is a problem which has not yet been solved satisfactorily, in the opinion of Willard C. Brinton, president, Terminal Engineering Co., New York. He was discussing the progress report on materials handling presented before the American Society of Mechanical Engineers on Dec. 3, at the annual convention in New York. This versatility must be compared with the special cases where uniform packages are taken over a constant route and in regular quantities. It is easy to design equipment if there is only one problem to solve. There is great difficulty, however, when one has a variety of materials, sizes of packages, distances, routes, etc., to deal with.

Emergency repairs constitute a large problem in handling materials. In a large steel mill one Saturday afternoon the speaker found about 300 men busily engaged in taking care of maintenance of machinery and equipment which had been run at top speed through the week. High-priced electricians, mechanics, carpenters and others were doing the manual job of hauling materials or carrying them on their shoulders, and more time was

consumed by them in this human haulage than in the practice of their several trades.

In response to a criticism of electric trucks on rough roadways, because of serious battery deterioration, Mr. Brinton said that adequate spring suspension would obviate this difficulty. He has had such equipment working successfully on a rougher surface than one usually expects a motor truck to traverse.

When there are so many starts and stops within an hour as are necessary in handling materials within a plant, including unloading cars and placing goods in stock, etc., gasoline-driven equipment is not so good. Maneuverability, backing ability, etc., are cardinal points required of this equipment. With electric trucks the operator turns on the current and gets his acceleration. There is no need to shift gears or anything else as is required in gasoline-driven equipment.

The versatility of trucks used for this purpose is one of their most important features. This goes along with their shortturning radius and the ability to steer with all four wheels. The latter is particularly important when the load is to be pushed into a definite position.

Transmission Association Holds Third Meeting

The third annual meeting and luncheon of the Power Transmission Association was held at the Hotel Commodore, New York, Wednesday, Dec. 4. Recommendations for reorganization of some of the association's activities were contained in a joint report of the executive committee and the merchandising advisory committee, which is headed by W. W. French, Dodge Mfg. Corporation, Milwaukee, Ind.

The report was presented by W. H. Fisher, T. B. Wood's Sons Co., Chambersburg, Pa., president of the association. A special committee with F. H. Willard, president, Graton & Knight Co., Worcester, Mass., chairman, has been appointed to set up a definite program along the lines recommended in the report. Closer coordination of group action and increase in publicity activities are among several recommendations to be considered by the special committee.

William Staniar, belting and transmission engineer, E. I. Du Pont de Nemours & Co., now consulting transmission engineer of the association, summarized the activities of the board of advisory engineers, pointing out that in the two years of its existence, the association had laid a good foundation and has become widely known.

W. S. Hays, Drexel Building, Philadelphia, secretary of the association, in outlining some of the activities of the year, gave in brief the results of a survey of the 1929 business of various divisions of the association. Increased sales in all lines, ranging from 13 per cent in the case of leather belting to 48 per cent in the case of short-center belt drive devices, were shown. The increase in belting sales was taken by some as an indication of a wider use of group driving and in this connection, the increased use of belt drive at the recent Machine Tool Show, as compared to the same Show two years ago, was commented upon. The individual motor was employed but there was a wider use of belts, the flexibility of the belt drive being said to be desired by many designers.

Dr. P. G. Agnew, secretary of the American Standards Association, outlined the organization and work of the A. S. A. and enumerated the standardization projects of direct interest to the Power Transmission Association. Membership in the A. S. A. is now before the board of directors of the P. T. A. In discussing Dr. Agnew's remarks, Secretary Hays said that the standardization of speeds of driven machinery would make possible the simplification of pulley sizes, and thus eventually reduce the inventories of pulley manufacturers.

Directors elected or reelected were

as follows: J. E. Henry, secretary, Medart Co., St. Louis; G. H. Fisher, president, Fisher Leather Belting Co., Philadelphia; J. H. Duffy, treasurer, Scandinavia Belting Co., Newark, N. J.; S. P. Browning, president, Ohio Valley Pulley Works, Maysville, Ky.; M. F. Dunne, Pyott Foundry Co., Chicago; C. M. Murray, president, Transmission Ball Bearing Co., Buffalo; D. G. Ong, president, U. S. Leather Co., New York, and H. L. Coates, Flexible Lacing Co., Chicago.

It was voted to include in the minutes of the meeting the association's regret over the death of A. E. Pyott, Pyott Foundry Co., Chicago, Charles E. Carpenter, president, E. F. Houghton & Co., Philadelphia, and Donald A. Hampson, member of the association's board of advisory engineers.

Railroad Club Dinner to Be Attended by 3000

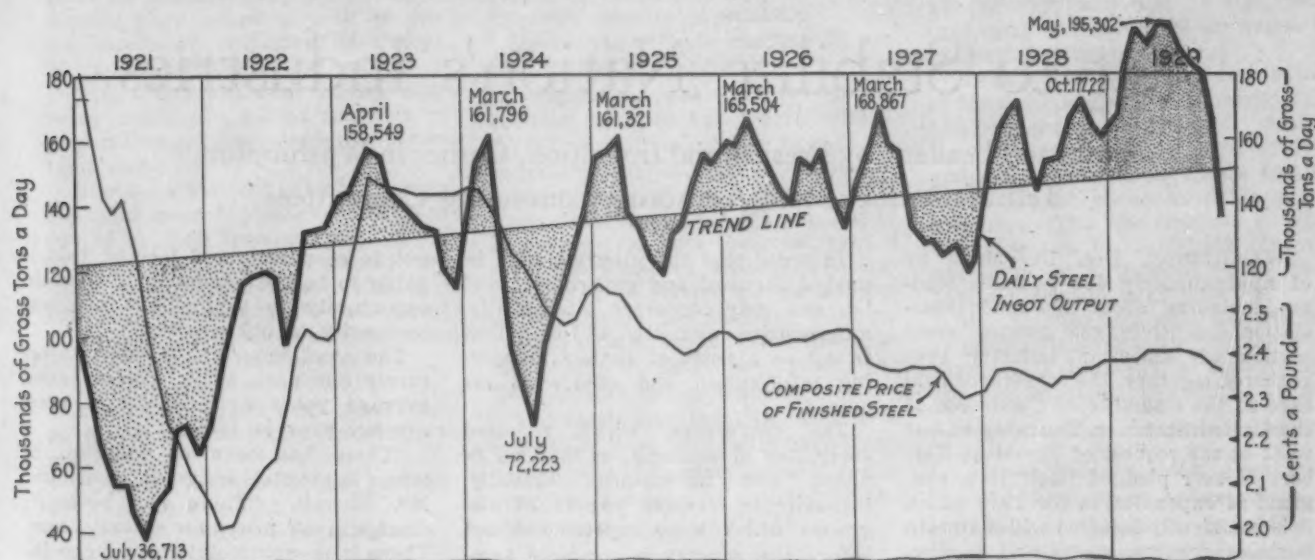
The New York Railroad Club will hold its annual dinner tonight (Thursday) at the Hotel Commodore, New York. More than 3000 reservations have been made. Eliot Sumner, president of the club, will preside. H. H. Vreeland, director of welfare, Interborough Rapid Transit Co., New York, will be toastmaster. After-dinner addresses will be delivered by J. J. Pelley, president, New York, New Haven & Hartford Railroad; George D. Ogden, assistant vice-president, Pennsylvania Railroad, and Congressman Charles Aubrey Eaton of New Jersey. The following railroad executives will be other guests of honor:

Frank Hedley, president, Interborough Rapid Transit Co.; W. S. Menden, president, Brooklyn-Manhattan Transit Corporation; M. H. Cahill, chairman of board, Missouri-Kansas-Texas; R. B. White, president, Central Railroad of New Jersey; C. E. Denney, president, Erie; Graham Sumner, Simpson, Thatcher & Bartlett; W. G. Besler, chairman of board, Central Railroad of New Jersey; J. M. Davis, president, Delaware, Lackawanna & Western; P. E. Crowley, president, New York Central Lines; L. R. Powell, Jr., president, Seaboard Air Line; C. W. Galloway, vice-president, Baltimore & Ohio; G. H. Foster, vice-president, Lehigh Valley; C. H. Ewing, vice-president, Reading Co.; L. S. Miller, president, New York, Westchester & Boston; J. W. Smith, general manager, Boston & Maine; H. J. Humphrey, president, Canadian Railway Club.

To Reroll 4000 Tons of Rails

The McKenna Process Co., Joliet, Ill., has received an order from the Chicago & Alton to reroll approximately 4000 tons of 90-lb. rails. These rails when rerolled will weigh approximately 80 lb. per yard.

Ingot Output in November Made the Sharpest Drop Ever Recorded in One Month. As a result the curve is below normal for the first time in many months. Finished steel prices are about on parity with those a year ago



Sharp Drop in Steel Ingot Output

Eleven Months' Production, However, Exceeds Any Complete Year Heretofore—
November Showed Lowest Daily Average Since 1927

PRODUCTION of steel ingots in November was almost 1,000,000 tons below the September and October figures, and was 750,000 tons below the total for November, 1928, according to figures prepared by the American Iron and Steel Institute. No drop of this magnitude has ever before been reported for one month. The calculated November total was 3,513,025 tons, compared with 4,511,650 tons in October.

On the daily basis November, with

26 working days, dropped to 135,116 tons from October's 167,098 tons a day. Not only was the November daily average the lowest of the year; it was the lowest since December, 1927, when 122,134 tons was registered.

Both open-hearth and Bessemer steel were hit by the decline, and about equally. Reports from open-hearth plants showed a drop of 22.7 per cent, from the 3,619,432 tons of October, to 2,797,488 tons in Novem-

ber. Similar returns from Bessemer plants showed a drop of 19 per cent, from the 644,528 tons of October, to 522,672 tons in November.

Year's Record Already Broken

Despite the heavy shrinkage during the month, its output has boosted the total for the accrued portion of the year to a figure far higher than was ever before reached in any complete year. At 51,268,079 tons, a gain was registered of almost 3 per cent above the total for last year, which was by a large margin a high record. Comparing the 11 months of this year with 11 months of last year—itsself a record at that time—the gain has been more than 5,400,000 tons, or about 12 per cent. The number of working days in the elapsed portions of the two years has been the same, at 286.

Electric and crucible ingots are not included in these totals. Production of these two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the United States.

In the diagram are traced the course of ingot production and finished steel prices for nine years.

A patented revolving distributor of the latest roller bearing type has been ordered from A. G. McKee & Co., Cleveland, by the Amtorg Trading Corporation, New York, for shipment to Russia, where it will be installed on a blast furnace. Two electrically-operated scale cars are covered also.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open- Hearth	Bessemer	Monthly	Daily	
January	3,273,294	498,691	3,990,902	153,496	26
February	3,300,407	521,250	4,043,457	161,738	25
March	3,692,648	567,330	4,507,217	166,934	27
April	3,505,104	564,110	4,305,382	172,215	25
May	3,394,301	582,128	4,207,212	155,823	27
June	3,010,341	528,193	3,743,903	143,996	26
July	3,068,257	528,588	3,805,598	152,224	25
August	3,379,625	569,771	4,178,610	154,763	27
September	3,375,654	544,710	4,147,893	165,916	25
October	3,795,800	599,098	4,649,968	172,221	27
November	3,442,112	590,669	4,266,835	164,109	26
Eleven months.	37,237,543	6,094,539	45,846,977	160,304	286
December	3,301,114	496,679	4,018,208	160,728	25
Total	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,833,093	186,080	26
August	3,988,729	668,023	4,927,253	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
October	3,619,432	644,528	4,511,650	167,098	27
November	2,797,488	522,672	3,513,025	135,116	26
Eleven months.	41,726,691	6,726,722	51,268,079	179,259	286

Act to Stabilize Nation's Industries

Industrial Leaders, by Presidential Invitation, Gather in Washington,
Tell of Outlooks and Authorize Continuing Committees

WASHINGTON, Dec. 10.—Made up of approximately 400 business leaders, including about 250 trade association executives, the greatest cross section of American industry ever gathered together, the conference held here at the Chamber of Commerce of the United States on Thursday of last week at the request of President Herbert Hoover pledged itself to a program of expenditures for 1930 which it is confidently believed will maintain business activity, wages and employment. It was roughly estimated that the outlay will involve close to \$18,000,000,000, thus giving assurance of the determination of business to put to practical application the remedy suggested by President Hoover in his address which opened the conference. His proposed solution, to use his own phrase, lay in "one good word—work."

In order that the program may be pushed forward and government and business may cooperate intelligently, an executive committee will be named to act as a point of contact, supplying information and advice as required.

The conference, which reflected every line of business, as well as finance and agriculture, actually, through the various papers of the groups which were represented, set before the country a complete symposium of conditions prevailing and in prospect. There was throughout an encouraging note sounded. The analyses were based on surveys for the most part, and spokesmen for the various lines of business were careful to avoid an attitude of undue optimism.

got to cooperate, and I think this is going to be the beginning of a great opportunity to expand the business prosperity of our country."

The steel industry, it was stated, rarely has peak years, prefers good average years and expects a good average year in 1930.

"There has been no inflation of prices in the steel industry," continued Mr. Farrell. "There has been no change in our prices for several years. There is no accumulation of large inventories. We will enter the new year with stable prices and stable wages. We cannot have stable wages unless we have stable prices, and we foresee no change in the iron and steel industry in 1930 in either."

Speaking on exports and imports as president of the National Foreign Trade Council, Mr. Farrell said that during the first ten months of the current year exports showed a gain of 6.5 per cent and imports a gain of about 9 per cent over those for the corresponding period of last year. The prospect was declared to be for a substantial excess of exports over imports for the year. Mr. Farrell said that there is no basis for reports of friction between the United States and foreign countries over what might seem to be an intensive effort to increase foreign trade.

"We have got to have an exchange of trade," said Mr. Farrell. "We thrive on exchange of trade."

Julius Barnes, presiding as chairman of the conference, read a telegram from Chairman James A. Campbell of the Youngstown Sheet & Tube Co., who, after saying illness prevented his attendance at the conference, announced that the board of directors of the company on Tuesday had appropriated an additional \$2,000,000 to its previous budget of \$15,000,000 for its 1930 construction and maintenance program.

Steel Makers Authorize \$500,000,000 Expenditures

SPEAKING for the iron and steel industry, as a delegate from the American Iron and Steel Institute, President James A. Farrell of the United States Steel Corporation, pointed out that the steel industry has had a profitable year. Earnings, he said, will enable manufacturers to make improvements long deferred.

"Expenditures already authorized and definitely planned in the industry approximate \$500,000,000," said Mr. Farrell. "That is within the industry. Speaking of the industry as a whole, commitments to that extent have been entered into."

"The program of one company calls for \$300,000,000 in its 1930-31 budget. The 1930 expenditure has been allotted; that is, the money has been voted and distributed to the different subsidiaries. Precisely this amounts to \$160,000,000, and the work is proceeding and will be continued to completion."

"Earnings in the steel industry in recent years were largely expended in plant maintenance. It is well known to those in the industry that our most modern machinery becomes obsolete in 15 or 16 years, so that it requires earnings and surpluses in order to keep up with the times. It is not a question at this juncture of unduly enlarging capacity in our industry, other than keeping in step with the growth of the business."

"The steel plants of the country, having had a good year, will bring plant equipment up to date and contribute their share to general prosperity."

The present rate of operations in the industry, Mr. Farrell said, approximates 65 per cent of capacity. In some lines, such as structural steel, railroad materials, and the heavier lines, it was declared, operations are more extensive than they are in the lighter, or the so-called seasonal lines.

The steel industry was reported as "getting ready for the usual impetus which takes place after the turn of a new year. About this time, we naturally expect a little slowing down." To show the demand in some lines, Mr. Farrell said, one company in November booked as much business as it shipped, a condition described as being most remarkable "in any year, good bad, or indifferent."

Mr. Farrell said he liked the idea of cooperation between government and business and declared that "we have reached a period where, if we are going to be successful, we have

Machinery Builders Report on Orders

SPEAKING for the machinery industry, Otto H. Falk, president, Allis-Chalmers Mfg. Co., Milwaukee, said that there are about 10,000 large and small institutions comprising the machinery manufacturing group and that they are just concluding the biggest year in their history. He said that he had received the request to make a survey of conditions so late that the investigation was only cursory, but that there appears to have been no recession of business result-

ant from the adverse psychological condition created by "recent Wall Street events." He said he had found no one in the industry who anticipated much, if any, change during 1930.

Reports from the Wisconsin Manufacturers' Association coming from 64 machinery concerns were read to the conference. In answering the query as to the present situation regarding advance orders and business prospects as compared with that a year ago, 27 reported no change; 26 reported an

increase and 11 reported a decrease. In reply to the question as to prospects for business during the next six months when compared with the past six months, 26 reported no change; 26 reported improvement and 12 reported a decrease, four of the latter being seasonal. All 64 concerns reported that no wage reduction is contemplated.

Another statement read by General Falk concerned business conditions reported by mail from a group of machinery dealers in Connecticut, New York, Ohio, Pennsylvania, and Wisconsin. Their reports, it was stated, are almost the same as those received monthly throughout the year.

They reported as follows:

Inquiries—80 per cent report fair to good, with a recent tendency to slacken.

Domestic orders—75 per cent report fair to excellent.

Foreign orders—Unsatisfactory,

only one or two reporting otherwise.

Labor situation—Generally satisfactory: Common, plentiful; but considerable scarcity of skilled.

Production—Plants running 75 per cent to 100 per cent.

Competition was declared to be keen but business was generally good.

"If you will allow me to make a suggestion which may be helpful, I would recommend," said General Falk, "that this conference go on record in asking that this Congress pass a tariff bill without further unnecessary delay, to relieve the uncertainty in business on this subject. It is my candid opinion that this would be more helpful than any other one thing in stabilizing business."

The machinery industry, said General Falk, sees blue skies ahead and will cooperate in every respect in any program that may be outlined by the conference.

Electrical Industry Looks for 3½ Per Cent Let Down in First Half

REPORTS from the electrical industry, according to the president of the National Electrical Manufacturers' Association, Clarence L. Collins, president, Reliance Electric & Engineering Co., had been received from 178 executives and in his judgment the first six months of 1930 will show a decrease in their productive activity of about 3.5 per cent as compared with the corresponding period of 1929.

It was stated that in spite of the slightly increased volume of business at this time, the aggregate figures on inventories show that the situation today is almost identical with that existing last year at the same time. Making approximate estimates for some of the companies that did not report, Mr. Collins said the questionnaire represented an aggregate in man-hours of about 500,000,000 or possibly an annual productive wage of \$300,000,000.

A significant fact was that the branch of the industry that repre-

sents electrical appliances going into the home, said Mr. Collins, has the expectation of an increase in 1930 over the corresponding period of 1929. The judgment of the executives of companies manufacturing products going into the building industry showed a decrease. A slight recession, it was said, was expected in products going into industrial plants.

It was predicted that the 1930 program of that part of the industry representing the larger electrical appliances, generating appliances, and power distributing appliances, such as go within a large industrial program for public utilities, will be fully equal to 1929. In the electrical products that tie in with the electrification of railroads, a slight recession of business is expected, it was stated. Major contracts, however, it was added, will be reflected in the business of 1931. In capital expenditures, the belief was expressed that those of the electrical industry will be nearly normal.

Capital Expenditures of Railroads Put at \$1,050,000,000

PROPOSED capital expenditures of the railroads amount to \$1,050,000,000 for equipment and roadway and structures, and it is estimated that the first quarter of 1930 will absorb \$212,000,000 and the second quarter, \$278,000,000, or a total of \$490,000,000 for the first six months as compared with \$350,000,000 total expenditures for the first six months of 1929.

R. H. Aishton, chairman, executive committee of the Association of Railway Executives, said:

"The situation as of Oct. 1 showed a greater authorized program of railway improvements and capital expenditures under way at that time

than in any similar period for the past five years. Briefly, it called for an expenditure within the next few months of \$674,000,000 or \$272,000,000 more than on the corresponding date in 1928.

The railroads do not believe there is anything in existing conditions that warrant them to reduce or abandon any part of their capital program. Instead, however, they are proceeding with confidence in the future business prosperity of the country and in reliance upon the full cooperation of industry in all its branches, equally interested.

"In addition to the capital expenditures outlined above, the railways are

expending this year \$1,300,000,000 or more in the purchase of supplies for operation and maintenance, ranging all the way from soap to steel castings, and \$3,000,000,000 in wages to railway employees.

"Both these forms of distribution of money, aggregating nearly four and one-half billions of dollars, the railways expect to equal in 1930 and will represent a direct flow of cash into the channels of trade and industry. This distribution is additional to the \$1,050,000,000 that the railways are now planning as their capital program next year."

Mr. Aishton also said that he was authorized to announce for the Pullman Co. that its capital expenditures for equipment in 1930 will be \$11,900,

Tribute Paid to Trade Press by Dr. Julius Klein, Assistant Secretary of Commerce, in address before Business Conference.

"A further factor contributing toward the success of any such undertaking as that which is now engaging the attention of business leaders everywhere is the vastly improved quality and increased influence of the trade press. It was but a short while ago that the resources of a very few large corporations permitted of any considerable collection of reliable trade and industrial data. Today the keen acumen of our trade editors and their expert staffs has made the sequestration of any important economic facts very difficult, if not impossible."

000, of which \$3,000,000 each will be spent during the first and second quarters.

Automobiles and Ships

THE country at large need not worry about the motor vehicle industry, the conference was told by Alvan Macauley, president, National Automobile Chamber of Commerce, and president of the Packard Motor Car Co. He said the industry doubtless would share to some extent any difficulties that may beset the country, "but we will never be down seriously or for long."

Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co., reported improvement in the shipbuilding industry but said that the shipyards of the country can handle 50 per cent more work than they are handling in 1929. He spoke of prospects, through awards of ships in connection with mail contracts to be good, but added that what is needed is a continued steady flow of new orders. This, it was declared, can be obtained only by the development of paying and prosperous steamship lines.

"It appears," he said, "that freight ships cannot be built in the United States and for the foreign trade with-

out further aid from the Government. The demand for more ships for the foreign trade is up to the Government and it is hoped that the action taken by it will be reasonable in character, so as to enable shipowners to operate them continuously and successfully."

The Continuing Committees

The two committees of business men who are to follow up the work of the National Business Survey Conference have not been appointed at this writing. One of these probably will have a personnel of 15 or 20. It will be a working organization of outstanding leaders, whose purpose will be "to obtain and collate more detailed reports and to devise measures to eradicate whatever weaknesses in the national economic structure they might reveal," according to announcement of the Chamber of Commerce of the United States.

The other committee will be larger and advisory in character, based on trade association representation.

It is assumed that a general committee named at the conference last week, which was made up of 70 business leaders, will assist in selection of these two committees, though this point was not made clear. Among members of the committee selected at the conference were James A. Farrell, New York, representing the American

Iron and Steel Institute, and General Otto H. Falk, Milwaukee, president Allis-Chalmers Mfg. Co., representing the machinery industry.

It was made clear at the White House that the Chamber committees will be temporary, rather than permanent. The President, in his address opening the conference, pointed out that the business interests had been invited "to create a temporary organization for the purpose of systematically spreading into industry as a whole the measures which have been taken by some of our leading industries to counteract the effect of the recent panic in the stock market."

In order to perform its part in the program the Department of Commerce has set up a new division to coordinate the construction programs of the Federal, State and local governments.

Chairman Julius Barnes, discussing features of the conference, said that the large capital expenditures for the purposes outlined must be provided from industrial treasuries or most largely by borrowings for capital investment. He pointed out how the Treasury refunded \$325,000,000 at 3½ per cent against its last borrowings at 4½ per cent, not long ago, "probably the most extraordinary change ever recorded in Treasury operations between transactions."

"Industry generally—the machinery of production—is better equipped and more intelligently managed than at any time in the past. Owing to long-continued good railroad service and the ability of manufacturers to get their needs promptly filled and their products promptly distributed, there are no disturbing stocks of goods or raw materials, and management in the meanwhile has become increasingly better able to adjust production to current demand.

"For the most part, too, this year has produced remarkable earnings, and the cash resources of most business enterprises are exceptionally strong. Credit has become plentiful, also.

"Agriculture, under the stimulus of the Federal Farm Board, has become enabled to organize itself on a more business-like basis and is making great progress already in this direction.

High Standards of Living Are Bulwark of Our Prosperity

"Moreover—and this is the most important aspect—there is today a greater and more widespread recognition on the part of all concerned—stockholders, manager, and Government—that our high standards of living constitute the bulwark of our prosperity and that the purchasing power of the people who buy our goods and services must be maintained.

"These are just a few of the indications of the real soundness of American industry. Taking the steel industry as an example, this year has been one of splendid progress. Production will probably exceed by about 10 per cent what it was in 1928. No big inventories have been built up, earnings have improved in all branches and prices for the most part have been stable for the reason that they have contained no element of inflation.

Healthy Outlook for Steel's Three Biggest Customers

"Steel's three biggest customers, the automobile, railroad and building industries, seem to me to justify a healthy outlook. We are a growing country and in addition to normal growth, which the Wall Street affair cannot seriously retard, the replacement factor alone in these industries furnishes a very substantial market for them and for ourselves. Just as the replacement factor in the automobile industry increases in importance as more automobiles go into service, so it is with buildings and so it has always been with railroads.

"It is upon the continued prosperous condition of our people generally that the future of our industry depends. But the determination of the Government and of the business leaders of the country to keep the wheels of industry turning, to provide continued employment, to protect purchasing power and to look forward may be regarded as a guarantee of sound and steady progress."

C. M. Schwab Sees Healthy Outlook

Business Almost Entirely Unrelated to What Happened in Wall Street, He Says, and Never in More Stable Position

"AMERICAN business has assumed today a role of greater importance in the social and economic life of the country than it has ever filled before." This statement was made by Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation, at the thirty-second annual dinner of the Illinois Manufacturers' Association, Dec. 10, at the Stevens Hotel, Chicago.

"For the first time in history, all the forces of business, banking, industry and transportation," continued Mr. Schwab, "have been marshalled under the leadership of the President himself in the most constructive peace-time effort any nation has ever seen. This is business and governmental statesmanship of the highest order. One does not have to be a confirmed optimist to see in Mr. Hoover's conferences something more than a determined and powerful endeavor to substitute a new psychology for the one that has been almost inevitable under similar conditions in the past.

Country's Business Structure More Stable Than Ever Before

"My own view is that two of the outstanding factors in the present

situation are these: This is the first time that business in its essential aspects can be regarded as almost entirely unrelated to what has happened in Wall Street, and the whole business structure of the country has in recent years become more stable than ever before.

"Several months ago, I suggested to the steel industry at the annual meeting of the American Iron and Steel Institute that the most fundamental progress made this year was in the degree of stability and balance which had become outstanding characteristics of our business. Other industries have made similar progress. The effect, therefore, of the conference between Mr. Hoover and the spokesmen for American business must inevitably be to preserve the stability and balance throughout the whole business structure. I think the results will be even greater and that we can also look forward to a wholesome expansion of business without the evils of artificial stimulation.

Industry Better Equipped and More Intelligently Managed

"Let me give you a few reasons for my own faith in our continued progress:

This Issue in Brief

How can you determine the most economical production quantity? Balance up between direct labor cost in production, and preparation or setting-up cost before production begins, is the criterion, says engineer.—Page 1585.

* * *

Not enough production foremen to supply needs of industry, says engineering society. Nearly 600,000 such positions exist. Yearly replacements number 30,000, but technical institutes are turning out only 10,000 graduates a year.—Page 1580.

* * *

Few mergers are really successful, says engineer. Theoretical savings are rarely realized, due largely to the fact that the effect on the most important factor, the human element, cannot be predetermined.—Page 1575.

* * *

Welding efficiency averages 75 per cent in all-weather work on oil line. Tests of arc-welded joints reveal that efficiency ranges from about 61 per cent to 94 per cent.—Page 1578.

* * *

Criticizes uses of case-hardened or nitrided materials for essential locomotive parts like main pins or axles. A crack in the hard, brittle surface is propagated through the ductile core. Hard wearing surface can be produced on a thin bushing, which can be replaced if cracks develop.—Page 1592.

* * *

Tungsten-carbide cutting tools may permit use of harder and stronger steels for parts subject to heavy stress in automobiles and other machines. Ability of the cutting alloy to machine hard surfaces opens possibility of using lighter sections.—Page 1594.

What is alloy steel? There is no clear understanding of just what an alloy steel is. Current statistics do not correctly measure entire production.—Page 1594.

* * *

Aircraft sales for 1929 will probably equal only one-half the estimate of 14,000. Production facilities for motors greatly exceed demand, but demand will catch up if production expansion slows down to a sane rate.—Page 1596.

* * *

Economic disturbances were formerly regarded as self-corrective. Will the Washington attempt to stimulate business produce a hesitant and prolonged adjustment?—Page 1597.

* * *

Are higher wages paid because of necessity or through belief in their economic advisability? With few exceptions, employers pay the wages the labor market dictates, says economist. Not so, says another, contrasting present situation with that of 1921.—Page 1599.

* * *

The business is too big if decisions are unduly delayed or if initiative is stifled. The ideal size of an organization depends in large degree on the extent to which authority can be functionalized.—Page 1600.

* * *

Cuts weight of part in half by substituting pressed steel for aluminum casting. Portable electric drill manufacturer also reduces labor and material cost one-third.—Page 1582.

* * *

Improves vitreous enamel surface by burning electrically. Close control of temperature betters quality of work. Smoke and gases are absent.—Page 1581.

Makes gray iron in rotary melting furnace. Flame enters at one end and leaves at the other. Contamination of iron by gas and oxide is slight. One pound of coal melts 7.4 lb. of iron.—Page 1586.

* * *

If you plan a merger, don't ignore the personnel. Experience shows that the confusion and suspicion resulting from throwing two or more organizations together often results in increased, rather than decreased, costs.—Page 1577.

* * *

Unwise extension of production facilities should receive attention of President Hoover's body of business leaders. Economist recommends that the body advise on use of capital.—Page 1598.

* * *

Steel output drops to lowest point since 1927. November daily production was 135,116 tons, almost 20 per cent below the October rate. But 11 months' total is a record, and surpasses any previous full year.—Page 1607.

* * *

Bakes aluminum casting cores in automatic conveyor oven. Conveyor chain is 660 ft. long, about 250 ft. of it being in the oven.—Page 1591.

* * *

Foundry equipment manufacturers contribute equipment for municipal foundry school. Grammar school graduates admitted to four-year training course in Cleveland school. After first year they work half time in foundries.—Page 1579.

* * *

Reduces raw material inventory 21 per cent by making longer and less frequent production runs on staple products. Raw material purchasers are scheduled to arrive just in time to meet production schedules.—Page 1584.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Concern of Business

“WE are concerned with employment. We are concerned with good wages. We are concerned with prices. And lastly, we are concerned with the continuance of good business, which will enable industry to earn sufficient to maintain all.”

—James A. Farrell, president, United States Steel Corporation, at the business conference held at Washington, Dec. 5

Our National Income

ANY apprehension that still exists because of the catastrophe in the stock market doubtless reflects incomprehension rather than reason. Fear of the unexplained is a characteristic of human nature. What has happened is still not understood. If we had better economic data we should better understand the situation.

During the prolonged upward movement in the stock market it was repeatedly pointed out by conservative economists that what was occurring was a writing up of the paper representing a part of our national wealth rather than reckoning an increase in that wealth itself. Similarly and in consequence there might be a writing up of our national income without there being any real increase in it.

These conditions produced much perplexity. Some authorities who estimate the national income figured it as rising at a rate of phenomenal rapidity and attaining a figure of upward of 90 billion dollars per annum, and although such an estimate appeared incredible it was adopted by bankers, financiers and promoters because it suited them. Other authorities, however, could not arrive at figures showing anything but a slow, normal increase and totals never much exceeding 75 billion dollars.

The only explanation of this discrepancy was that one set of economists was reckoning what might be called earned income, reflecting the production of goods and services, while the other set was reckoning earned income plus capital gains, so to speak, following the thought in the requirements for our income tax returns. Plainly it would ensue from this that capital gains might in some year be replaced by capital losses, with strange exhibitions in the reckoning of our national income. If such a conception were valid—as it is not—there would be grave cause for apprehension now.

If there had been any real appreciation in wealth, realized in capital gains and so appearing in national income, that should have been followed by increase in

earned income, inasmuch as it would have had to be expended for goods and services. Our national production statistics did not, however, in the aggregate reflect any such thing, and contemporaneously it was perplexing that they did not. The only logical explanation was that realized income from capital gains was being used not for more goods and services but rather for the purchase of other stock certificates, less the cut of the tax-gatherer and some relatively minor diversions, and that some day we might descend the hill just as we had ascended it.

We are mindful that we are attempting herein to draw a very broad picture and that there are many details that would look conflicting if they were examined. Thus we have certainly produced greatly increased quantities of some goods; automobiles, for example, and the steel and copper with which to make them and the petroleum with which to operate them. On the other hand we have produced less of other things. Such conditions show dislocations that may be in the way of progress, or at least in the way of change in our mode of living and consequently will be enduring; but which may have been carried too far and therefore require correction.

The adjustment of economic dislocations is apt to be vexatious, just as is the reknitting of a broken leg; but a broken leg has none of the seriousness of a broken spine. The fundamental things in our national economy are our earnings and our thrift. We are certain that nothing has happened to impair our earning capacity. We may reasonably expect that our earned income in 1930 will be as large as in 1929 unless there be some adversity of nature that no one can foretell. We shall not, however, have any more illusion that our income is more than it really is or ever was.

Direct and Removed Demand

IN present conditions it is especially necessary in making appraisals of the state of trade, as indicated by demand for various commodities, to make allowance for circumstances in the individual commodity, whether it is one in direct demand or in removed demand. A commodity in direct demand, according to the terms we are here using, is one that is being sold directly to the ultimate consumer. The demand is one degree removed if the commodity is sold to a dealer who sells to the ultimate consumer or if it is raw material for a manufacturer who sells to the ultimate consumer, and so on. A commodity may be many stages removed.

In the long run it is necessarily the ultimate consumer who determines the total volume of demand. Except in the possible psychological case of a “buyers’ strike,” of which we heard so much in 1920, some of it

perhaps not altogether to the point, the ultimate consumer buys according to his resources. This ultimate buying has a momentum, so to speak, producing relative steadiness.

Not so with the removed demand, which is subject to two influences. First, the appraisal of the future made by the buyer, whereby in anticipation the retailer may buy less goods or the manufacturer less material. Second, during the course of a slowing down, either of these buyers will purchase particularly less because with a smaller turnover he needs less goods in stock or material in process of manufacture.

This is a matter that may be overlooked on account of the point so much mentioned that in these recent years stocks have not been carried. The reference is really to reserve or extra stocks. There must be some goods in the retail store or in the warehouse and some material progressing through the manufacturing establishment, and the amount will vary according to the volume or rate of turnover.

A familiar and apt illustration is found in outside or purchased scrap for the open-hearth steel plant. In this case there is an exaggeration, for as the plant slows down it has a supply of works scrap disproportionate to its new rate of working, and the outside scrap must take the total fluctuation. By the same token the requirements in purchased scrap become particularly large when the plant is speeding up.

When a change occurs in the general trade outlook, the immediate effect is least upon direct demand and greatest upon demand that is removed the largest number of stages from the direct. Demand upon the clothing store will be one thing, demand for pig iron to make textile machinery another, decreasing more or increasing more according as the general outlook is down or up. In the last few months the steel demand of the automobile industry has furnished a concrete illustration, slowing down more rapidly than did the actual production of automobiles. The scrap demand of mills specializing in automobile steel slowed down still more.

To determine the state of trade and prospects from the indexes, all indexes should be consulted, but each should be considered according to the proximity or remoteness of the commodity relative to ultimate consumption. When this has been done there is a disclosure of the position of the buyer, which is made up of two elements, his actual condition, physical and financial, and his mental attitude as to the future. Statistics of retail sales represent two factors, the financial condition of the people and their views as to the future, whether they think they see better or poorer times ahead for them.

With a commodity of ultimate consumption subject to seasonal variation in demand, the more removed materials, the successive raw materials, will fluctuate much more in demand than the commodity itself, there being curtailments all along the line at one time and expansion all along the line at the other. By this principle a commodity in particularly poor demand at one time will be in particularly good demand at another.

A MEASURE of the reduction in employment prior to the Wall Street crash is afforded by figures of the United States Bureau of Labor Statistics. In

2265 identical plants in ten branches of the metal-working industries, employing 1,214,708 people in September, the drop to 1,160,559 on payroll in October was 4.46 per cent. The decline in payroll total was not quite so sharp, having been 3.67 per cent on a September weekly wage of \$38,373,000. Pay envelopes averaged \$31.59 a week in September, going up slightly to \$31.86 in October. Of the loss of 54,149 from payroll lists, no less than 45,331 were in the automobile branch.

A Question of Ethics

THE Soviet Union is engaged upon a five-year plan for economic construction. An interesting and elaborate book describing this program has recently been issued by a well-known New York publishing house under the auspices of the Amtorg Trading Corporation, which is the commercial and industrial representative in America of the Soviet Union. The development plan is ambitious, calling for the expenditure of 33 billion dollars for the creation of plants during the next five years. The proper equipment of a great country like Russia would undoubtedly lead to such an investment, or more. Doubt may be entertained as to whether the Soviet Union can finance it; and whether it could be physically consummated in five years, even if it can be financed.

This program is necessarily framed with reliance upon American assistance, in rendering which American engineers, manufacturers and exporters are obliged to take their own chances, inasmuch as the Soviet Government of Russia has not been recognized by the American Government and there is no probability that it will be until the Soviet Government has acceded to our straightforward conditions of (1) the return of property confiscated from our citizens, (2) recognition of indebtedness owed to our Government and our citizens, and (3) abstention from communistic propaganda in our country.

With agreement to those simple terms of human morality we should have nothing but good wishes for the Russian Government and the people whom it represents. If the Russian people choose to continue to conduct themselves in accordance with a social theory that we condemn, that is their own affair. Such a difference of opinion would not prevent us from extending such assistance as might be requested.

Consequently, when it is now a matter of developing economic facilities, such as railroads, the generation and transmission of electricity, etc., or the development of natural resources that are unquestionably the property of the Russian nation, we may be generous in our attitude, always with reservations in respect to risks that must be assumed. We may even be careless as to questions of title among the Russians themselves. When, however, there are properties involved that were confiscated from foreigners, questions of ethics may well be considered.

Leslie Urquhart, chairman of the Russo-Asiatic Consolidated, Ltd., draws attention to this in a recent communication to the *Engineering and Mining Journal*. The Soviet Government took the mines belonging to that company, the metallurgical works that it had erected, and also its working capital, in respect to which the company has a claim against the Soviet

Government for \$66,000,000 in case it decides not to return the property. In 1922 the Soviet Government signed an agreement to return the property, together with compensation of over \$2,000,000, but has refused to carry it out. American engineers who are invited to assist in the development of such properties should pause to reflect as to professional ethics.

Russo-Asiatic was probably the severest sufferer in this way, but we may remind ourselves that many American companies were likewise treated. The Singer Mfg. Co. wrote off a loss on its investment in Russia in terms that approach that of Russo-Asiatic and would have ruined any enterprise that did not possess its colossal strength, while the International Harvester Co. and many others were similarly robbed.

We think that if the Russians want copper, lead and zinc, sewing machines, agricultural equipment, etc., they would do best to return these properties to their rightful owners and let them furnish the goods that are desired, being sure that they would then be furnished more economically than the Russian or any other Government could do. This, however, is a question of economics as to which there may be different opinions. The other thing is a question of morality, as to which there can be only one opinion.

Paradoxes in Acts and Thoughts

THE existing situation among us is producing some paradoxical occurrences but much more in paradoxical thought. Of the latter we have made notes of a few. We derive them mainly from remarks in the financial journals. But we interlard them with comments that are more serious.

One expressed opinion was that in the efforts to promote business the Sherman law will be permitted to become quiescent. It would follow from this that the Sherman law is a discourager of business. Well, perhaps that is so.

Anyhow, the Sherman law is supposed to be promotive of competition. In the retailing of cigarettes competition has all but ruined a great chain store system, and as for the little retailer his sales have become more or less accidental and he sees his means of livelihood vanishing, wherefore his organization is appealing to somebody to do something. This looks like the Sherman law working upside down.

The copper producers are adjusting themselves to

a contracting demand by curtailing their production, wherefore alert bears sold copper stocks and a journalistic writer expressed the opinion that a diminished production was as bad as a reduction in price. However, the copper producers did not see it that way.

The Prince of Wales urged the women of his country to lengthen their skirts and otherwise increase their clothing in order to assist the British manufacturers of textiles. American manufacturers would like the women of this country so to conduct themselves. The style makers of Paris appear to be conniving in this. Our women, however, are vociferating that they will never forsake the freedom of short skirts, and Paris be hanged.

Mr. Ford made a dramatic gesture in raising the wages of his employees. The textile manufacturer has not the means to do such a thing. Mr. Ford resolves the labor question into a quasi-baronial system of profit-sharing. Of course that does not work when there are not any profits and raising wages is not therefore a general panacea for counteracting industrial depression.

Our last remark leads us to the thought of what would be the situation if the encouraging recovery in the stock market should continue; and if stocks should regain the high level of last summer. Should we then look back upon October and November as merely a nightmare?

IF individual demand is caused to shrink, under the influence of a drastic decline in stock market prices, or of a conception of thrift as saving money by withdrawing it from active business, or of a spread of indolent habits, then industrial activity must decline. Higher wages could help consumption were productive efficiency increased in proportion. Cutting the percentage of profit to raise wages could only have the effect of checking the improvement of plant, equipment, designs, tools and fixtures, which is indispensable to the increase of output per worker, and therefore to the increase of the general purchasing power. Western philosophies may follow those of the Orient in theorizing that less work and more leisure is the ideal; but the people of industrialized countries find their greatest comfort and happiness in discovering and supplying new wants.

CORRESPONDENCE

Early Coal Breaker of Steel Construction

To the Editor: For the sake of historical accuracy, I refer to the statement on page 1519 of your Dec. 5 issue, to the effect that there were no steel coal breakers in the Pennsylvania anthracite region 25 yr. ago, and refer you to the Transactions of the American Institute of Mining Engineers, Vol. XIX, which contains a paper by the late Eckley B. Coxe, describing the iron breaker at Drifton. This paper was read at the New York meeting of the in-

stitute in September, 1890. This breaker was completed about that time, and has been in operation ever since. No wood enters into its construction except the window sash. There are many cast iron columns in the structure, but considerably more roll shapes and fabricated girders.

This breaker stood alone as an example of iron and steel construction for many years before the coal companies gathered sufficient courage to adopt the steel construction method. In fact, Mr. Coxe's own company built a breaker entirely of wood, some ten or twelve years after the Drifton breaker was built. I believe, however, that it was more a question of the difference in the cost of material in that day.

J. H. PENNINGTON,
Manager, McFarland Foundry & Machine Co.
Trenton, N. J.

Bearing Investigations Put Under Way

At a meeting of the Heavy-Duty Anti-Friction Bearing Committee of the American Society of Mechanical Engineers, in the Engineering Societies Building, New York, Dec. 6, it developed that two of the leading bearing manufacturers have large-scale experiments already under way in efforts to determine bearing pressures on roll necks and elsewhere. These investigations are independent of that which is being sponsored directly by the committee.

Sufficient support to carry on the committee's work for about a year has already been pledged by steel companies, bearing manufacturers and others. A fellow is to be appointed whose work will be done under the general direction of Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh. He will collate all available data and discover places where experimental work would be most useful. He will carry on experimental work, insofar as may be possible, both in the Carnegie laboratories and in operating steel mills.

It is hoped, by the coordination of these several efforts, to make it possible to design roller bearings for this particular work which will take up less space than now seems to be required, and which at the same time can still be depended upon to function adequately under operating conditions. It is realized that the investigation is likely to cover a considerable expanse of time, but those backing it appear to be satisfied to carry it on to completion.

Scrap Institute Proposes Inspection Service

At a meeting of the Boston chapter of the Institute of Scrap Iron & Steel, Inc., Thursday evening, Dec. 5, at the Parker House, Boston, it was voted to recommend that a national inspection bureau be established by the institute to inspect material shipped to steel mills. It was recommended that inspection be by a neutral body; that local customs of each mill be taken into consideration during inspection, and that the cost of inspection be charged to the shipper requesting such inspection.

Will Not Expand Taylor Tin Plate Plant

The Corrigan, McKinney Steel Co., Cleveland, announces that it does not contemplate making extensions to the tin plate plant at Cumberland, Md., of the N. & G. Taylor Co., Philadelphia, which it recently purchased. The plant will continue to be operated under its present name and the new owners will follow the policy of the old organization in limiting its output to high-quality products in tin plate and terne plate.

The Week in Business

Drift of Current Financial and Economic Opinion

SOME tightening of credit, not necessarily portentous, is indicated by a large increase in loans on securities by member banks of the Federal Reserve System (8369 millions of dollars at the end of November against 6724 millions a year ago). A decided expansion in commercial loans is also shown. The total of bank loans on securities outside of New York, Benjamin Baker points out in the *Annalist*, continues practically undiminished, and he concludes that, with the increase in total loans, a large carry-over from the stock market crash is still to be disposed of; that an increase in loans can hardly be accounted for on the score of business activity. "This situation," he says, "is one of the indeterminate elements in the business outlook." He suggests that the when and extent of the recovery will depend on how courageous and thorough the liquidation is.

The Bureau of Business Conditions of the Alexander Hamilton Institute believes likewise that the increases in commercial loans represent to some extent borrowing on other assets to protect security holdings. The Federal Reserve Bank of New York finds that the liquidation has been almost wholly in loans by lenders other than banks.

Would Control the Business Cycle

Much that is being written regarding the Hoover conferences is highly repetitious. The plans of the more or less temporary committee or economic council to project the influence of these conferences and secure concrete results in maintaining employment has naturally brought out a few observations that the council may be intended to arrest or modify the business cycle. If it shall prove possible to "prevent the occasional depression which has hitherto been felt with regular irregularity," says Theodore H. Price, in *Commerce and Finance*, "then science will have achieved a great victory over human nature."

Words of caution still appear that the expansion programs encouraged by these Washington conven-

tions must not be extended to increase activity among industries that actually require adjustment downward, lest the results aggravate the very conditions in need of correction. Leo Wolman, of the research staff of the National Bureau of Economic Research, makes the point that these meetings are of indispensable service, in the field of public work, by securing the whole-hearted cooperation of thousands of public officials and the breakdown of traditional executive procedure through the pressure of organized public opinion.

High Wages and Prosperity

Out of the welter of analyses and surveys of the causes of the Wall Street crash is coming a questioning of popularly accepted explanations of the prosperity which preceded it. The *Financial Chronicle* emphasizes that in holding that high wages are the key to prosperity, we are living in the midst of a huge delusion. Its argument in part is that the present static scale of high wages was begotten of the war, that agriculture and common labor have had to meet peace time conditions, that "the receipt of high wages by the few, increasing their consuming or buying power (though at the expense of increased price to the many) enabling them, let us say, to pay more for goods bought for sustenance and use cannot be the chief cause of 'prosperity,'" because this fraction of labor cannot consume the total production of all other labor. Meanwhile that journal holds the Reserve Banks as responsible for the whole speculative debauch.

As to the end of the period of the recession, rather vague guesses are made as yet in circles outside of business and commerce. A passing reference is made by the National Industrial Conference Board that the American situation is not free from world-wide conditions, but if it is money that is needed, to increase international trade, late indications are that foreign loans are again becoming popular in the United States.

Iron and Steel Markets

Sentiment in Steel Trade Improves

Resumption of Automotive Demand, Large Tin Plate
Releases and Sustained Railroad Needs
Are Heartening Influences

SENTIMENT in the iron and steel industry has improved. December will be a poor month both in shipments and production, but this fact is not causing concern, since most consumers are reducing their stocks to a minimum preparatory to taking inventory and the price situation holds no incentive for forward buying.

What has impressed the trade is the reassuring manner in which business has reacted to the stock market crash. Apprehension regarding possibilities has given way to manifest satisfaction with what has actually occurred in recent weeks. Railroad orders, shipbuilding contracts, steel fabricating work and specifications from farm equipment makers have been in consistently good volume, apparently unaffected by Wall Street deflation.

Among some of the miscellaneous consumers also there have been evidences of a good rate of activity. Wire rope makers are feeling the stimulus of larger demands from public utilities. Hardware manufacturers and steel barrel makers have increased their specifications. Chicago reports crane and shovel builders busy, with books well filled for four months. Nowhere are there signs of a general paralysis of trade such as developed after other stock market panics.

Not the least among encouraging factors is a betterment in demand for automobile steel. Motor car builders have placed a fair amount of bar, sheet and strip business in new orders, specifications against contracts or releases of suspended shipments, and two of the larger manufacturers have put out inquiries for their first quarter requirements in steel bars. Although it will probably be some time after the first of the year before the motor car industry gets back to fair operations, production of new models in the low-priced class is slowly increasing. With returning confidence, the automobile trade is surveying prospects for 1930, and, while estimates of the year's output are still conservative, they range from 4,000,000 to 4,500,000 vehicles.

The scrap trade at Chicago and Pittsburgh shares the better feeling manifest among steel producers. A mill purchase of 10,000 tons of heavy melting scrap at the former center was followed by advances of 25c. to 50c. a ton in prices paid on dealers' trades. Prices at Pittsburgh also are pointing toward greater strength.

Steel ingot production has undergone little change since a week ago. The output of Steel Corporation and Bethlehem plants remains at 68 per cent of capacity. District operations have increased in Alabama to 85 per cent, but appear to have receded at Buffalo and Youngstown, where production is irregular, probably not averaging much more than 40 per cent. The Chicago and Pittsburgh district rates are

unchanged at 65 per cent. With the approach of Christmas, output is expected to contract further, since year-end mill suspensions are likely to be longer than usual.

Railroad equipment business includes a purchase of 1285 freight cars by the Missouri Pacific, supplementing that road's order for 1000 cars a week ago. The Van Sweringen lines are expected to enter the market in a week or two for 13,000 cars.

Rail bookings have been augmented by 23,000 tons placed by the Atlantic Coast Line with the Bethlehem Steel Co. and 5100 tons by the Elgin, Joliet & Eastern with the Illinois Steel Co.

Structural steel lettings were in good volume for the season, totaling 35,000 tons. New inquiries, at 31,000 tons, include 19,000 tons for New York subway work. The contract for 55,000 tons for the Empire State Building, New York, is due to be awarded within a few days. Evidence of progress on public utility programs is seen in inquiries for a number of structural projects, among them a 3000-ton addition to a Chicago district power station. Fabricated steel awards in metropolitan New York in November totaled 44,000 tons, compared with 27,500 tons in the same month last year.

Demand for ship steel continues to expand. W. R. Grace & Co. will build one to four vessels, taking 6000 tons of steel each. About 5000 tons of plates will be required for nine oil barges awarded to the Bethlehem Shipbuilding Corporation. The Tidewater Oil Co. has placed two 13,000-ton tank ships with the Sun Shipbuilding Company and the Standard Shipping Co. will award contracts for four tankers.

Mills making a diversified line of products have been faring better than those more largely dependent on the automobile industry. Bookings of railroad steel, structural steel, tin plate and ship steel help to explain the Steel Corporation's gain in unfilled tonnage in November. Shipments averaged 40,000 tons a day and bookings 41,000 to 42,000 tons, and the net gain for the month was 38,783 tons.

The railroads, in addition to placing equipment and rails, are in the market for plates, shapes and bars. The Norfolk & Western and the Chesapeake & Ohio are each inquiring for 2500 tons.

Tin plate specifications are improving and the mills of the leading producer are now running at 80 per cent of capacity. This rate contrasts sharply with 50 per cent operations in the sheet industry and 20 to 40 per cent output by strip mills.

Pig iron demand continues to lag, but more interest is being shown in first quarter requirements both by the automotive industry and other consuming lines.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
No. 2 fdy., Philadelphia.....	\$21.26	\$21.26	\$21.26	\$21.26
No. 2, Valley furnace.....	18.50	18.50	18.50	18.00
No. 2 Southern, Cin'ti.....	17.69	17.69	17.69	20.19
No. 2, Birmingham.....	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.....	19.50	19.75	19.75	20.25
Basic, Valley furnace.....	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	20.01
Malleable, Chicago*.....	20.00	20.00	20.00	20.00
Malleable, Valley.....	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh.....	19.76	19.76	19.76	19.26
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	100.00	100.00	105.00	105.00

Rails, Billets, etc., Per Gross Ton:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh.....	35.00	35.00	35.00	33.00
Slabs, Pittsburgh.....	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh...	40.00	40.00	40.00	38.30
Wire rods, Pittsburgh.....	40.00	40.00	40.00	42.00
Skelp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.90

Finished Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.90	1.90	1.90	1.90
Bars, Chicago.....	2.00	2.00	2.00	2.00
Bars, Cleveland.....	1.90	1.90	1.90	1.90
Bars, New York.....	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.90
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York.....	2.17½	2.17½	2.17½	2.22½
Structural shapes, Pittsburgh..	1.90	1.90	1.90	1.90
Structural shapes, Chicago...	2.00	2.00	2.00	2.00
Structural shapes, New York...	2.09½	2.09½	2.14½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh..	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh..	2.75	2.75	2.75	2.85

Finished Steel, Per Lb. to Large Buyers:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
Sheets, black, No. 24, P'gh...	2.75	2.75	2.75	2.85
Sheets, black, No. 24, Chicago	2.85	2.85	2.85	2.95
dist. mill.....	3.40	3.40	3.40	3.60
Sheets, galv., No. 24, P'gh...	3.50	3.50	3.60	3.70
Sheets, galv., No. 24, Chicago	2.35	2.35	2.35	2.10
dist. mill.....	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh.....	2.40	2.40	2.40	2.65
Wire nails, Chicago dist. mill..	2.45	2.45	2.45	2.70
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh.....	3.05	3.05	3.05	3.30
Barbed wire, galv., Chicago	3.10	3.10	3.10	3.35
dist. mill.....	5.35	5.35	5.35	5.25
Tin plate, 100 lb. box, P'gh...				

Old Material, Per Gross Ton:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
Heavy melting steel, P'gh....	\$15.25	\$15.25	\$16.75	\$17.75
Heavy melting steel, Phila....	14.50	14.50	15.00	15.00
Heavy melting steel, Ch'go....	12.50	12.50	13.25	14.50
Carwheels, Chicago.....	13.50	13.50	14.00	14.25
Carwheels, Philadelphia.....	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh.....	14.50	14.50	15.00	14.50
No. 1 cast, Philadelphia.....	15.00	15.00	16.00	16.25
No. 1 cast, Ch'go (net ton)...	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Phila.....	15.50	15.50	16.00	15.50
No. 1 RR. wrot., Ch'go (net)..	12.00	12.00	12.50	13.25

Coke, Connellsville, Per Net Ton at Oven:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
Furnace coke, prompt.....	\$2.65	\$2.65	\$2.65	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery..	17.75	17.75	17.75	15.75
Tin (Straits), New York.....	39.62½	39.37½	39.37½	49.50
Zinc, East St. Louis.....	6.00	6.00	6.25	6.35
Zinc, New York.....	6.35	6.35	6.60	6.70
Lead, St. Louis.....	6.10	6.10	6.10	6.35
Lead, New York.....	6.25	6.25	6.25	6.50
Antimony (Asiatic), N. Y. ..	8.62½	8.62½	8.62½	9.62½

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry Looks to Moderate Improvement Early in New Year—Pig Iron Output Further Curtailed

PITTSBURGH, Dec. 10.—Improved sentiment, which began to make itself felt about the first of the month, is still the dominant feature of this market, although it is now only too evident that December is going to be a very poor month from the standpoint of both shipments and production. Consequently, steel makers have turned their attention to the prospects for the beginning months of the new year and invariably find them encouraging. The explanation offered by some that conditions can hardly grow worse is far from satisfactory, as they have been far worse even in the memory of the less experienced, and the expectation of improved steel demand in January and February must be based on much more tangible evidence.

It is possible that too much importance is attached to the report that the leading maker of low-priced automobiles is planning a schedule of 180,000 cars in January. The common supposition is that other automobile makers, particularly those in the same price class, must also increase operations accordingly. This does not necessarily follow, but it does seem reasonable that the larger automobile companies may be expected to receive considerably heavier steel shipments in January than in November or December.

Other large consuming industries are seemingly more definitely com-

mitted as to their needs. Users of steel, both small and large, are reducing their inventories as much as possible this month, and will certainly stock up again after the first of the year. Present specifications are nearly all for urgent shipment and this offers proof of the closely regulated flow of raw materials into plants. Another point emphasized, especially by makers of heavy steel products, is the fact that steel for most of the heavy railroad buying in the present quarter will not be rolled until early next year, and will provide heavy backlogs for certain producers.

Steel ingot operations in the im-

mediate Pittsburgh district do not average above 65 per cent of capacity this week and this is considerably higher than the average in the Valleys or the Wheeling district. The well-sustained schedules of the two largest steel producers in the Pittsburgh area are still responsible for the better showing here.

Among the finishing mills, the departments making rails, structural shapes and plates are running at a slightly better rate than the open-hearth average, but the sheet industry is not above 50 per cent and bar mills are no better off. Strip mills continue to curtail production, and complete suspension of activity Christmas week is already planned by some strip producers. Other companies will take advantage of holiday week to close some departments and will operate mills at as high a rate as is justified this week and next in order to raise Christmas pay envelopes.

Prices on finished steel products are still holding in a general way, at least among the smaller buyers, who usually pay the full market quotations. Few of the larger consumers have covered for their first quarter requirements.

Pig Iron.—This market is beginning to show signs of life. While there has been no appreciable increase

in sales over last week's, sellers in this district have taken the usual number of small lots for spot delivery, and one merchant furnace took an order for 500 tons of foundry iron. Inquiry for first quarter is also beginning to come out. The Westinghouse Electric & Mfg. Co. is asking for prices on the usual quarterly tonnages required at its Trafford City, Pa., and Cleveland plants, and a few other buyers who have not yet made formal inquiry are preparing to do so. Sellers who have been canvassing the trade rather thoroughly in the last week or two report considerable activity in prospect for malleable as well as jobbing foundries, and the steel foundries will undoubtedly require a considerable tonnage during the first quarter. Consumers' stocks are low, and efforts are being made to reduce them to the minimum for inventory taking. For that reason, shipments continue to decline slightly. The Davison Coke & Iron Co. has banked its Cherry Valley furnace, which leaves only three strictly merchant furnaces operating in Pittsburgh and the Valleys, and reduces merchant iron output to the lowest point of the year. All sellers have reaffirmed the present prices of \$18.50 for foundry and basic iron, and \$19 for malleable and Bessemer for first quarter, and a few sales have been made at those figures. The local furnace will continue to quote prices 50c. over these levels.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel.—So far as can be ascertained, none of the users of semi-finished steel in this district has placed a first quarter contract. In many cases considerable tonnage on present contracts is yet to be shipped, and as companies are not anxious to receive this material be-

fore the end of the year, many of them will enter the new year with some tonnage owed them on old contracts. This is particularly true in the case of strip and sheet makers, who have been operating at a very low rate in the last two months. Under the circumstances, present quotations of \$35, Pittsburgh or Youngstown, on billets, slabs and sheet bars are still untested. A Cleveland mill is said to be soliciting first quarter sheet bar business at \$34, but this competition is not yet a factor in the Pittsburgh district. Nevertheless, sharp declines in sheet prices have made the sheet bar prices comparatively high, and some downward revision would not be considered unusual at this time. Forging billets are holding at \$40, Pittsburgh, and wire rods at the same figure. A few users of rods have closed for the first quarter. Sellers of skelp are renewing contracts on the old basis of 1.85c., Pittsburgh.

Bars, Shapes and Plates.—The market continues rather dull, and interest is centered in first quarter prospects rather than in the immediate outlook. It seems certain that the remainder of the month will see no marked improvement in demand for bars, while contemplated projects requiring heavy tonnages of shapes and plates are likely to be postponed until after the first of the year. A local building for McCann & Co., requiring 900 tons of shapes, was placed last week, while 450 tons for transmission towers in Louisiana was taken by a local fabricator. Otherwise structural awards have been few. However, shape mills are well supplied with tonnage for some time to come and are running at a better rate than many other departments. Car builders tributary to Pittsburgh mills are still adding to their backlogs, and one is now booked at a fair rate over the first half of next year. Steel tonnage releases for this business are not reaching local mills at a very brisk rate. Barge yards are cleaning up old orders and a few units are being built for stock. About 1400 tons of plates will be required for water tanks in Wisconsin and Long Island, which have been placed with a local fabricator. The bar business is still exceedingly dull, but some of the dependable consuming indus-

tries have not reduced their requirements very much this quarter. However, cold-finishing mills are taking only small tonnages, and, with the reinforcing bar trade seasonably quiet, aggregate demand would not be impressive even if the automobile industry were operating at a normal rate. Occasional price shading is reported from time to time, but no transactions have come to light which might indicate a market quotable at less than 1.90c., Pittsburgh, on bars, plates and shapes.

Bolts, Nuts and Rivets.—This industry has not felt the lessened steel buying as much as some other departments, and most of the reduction in demand in the last few weeks can be traced to seasonal considerations such as year-end inventories. Shipments to the automobile industry have naturally declined, but the railroads are increasingly larger buyers, and the average operating rate for the industry is not less than 50 per cent of capacity. Present quotations of 70 per cent off list on bolts and nuts, 70 and 10 on small rivets and \$3.10 a lb. for large rivets, have been reaffirmed for first quarter business and contracts are now being closed for that period.

Rails and Track Accessories.—Specifications for track supplies are light, but it is much too early to begin shipping tonnage for spring work. Rail mill operations are gradually improving, but will not reach their peak before January or February. Light rails are moderately active. Prices on track accessories are holding fairly well in a quiet market.

Wire Products.—Business is quiet, but spot orders for small quantities of wire and nails from jobbers are accounting for normally good tonnage for this time of the year. Comparatively, demand for manufacturers' wire is hardly so good, as this product is dependent enough upon the automobile industry to be seriously affected by low production in that field. The trade is now being canvassed rather actively for first quarter contracts, and a number of users have closed for that period at \$2.40 to \$2.50 on wire nails, and 2.55c. to 2.65c. on annealed wire. Wire mills are running at 40 to 50 per cent of capacity.

THE IRON AGE Composite Prices

Finished Steel

Dec. 10, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.391c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Dec. 10, 1929, \$18.29 a Gross Ton

One week ago	\$18.29
One month ago	18.38
One year ago	18.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	\$18.71, May 14;	\$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.22c.
Del'd New York.....	2.24c.
Del'd Cleveland.....	1.85c. to 1.90c.
F.o.b. Cleveland.....	1.85c. to 1.90c.
F.o.b. Lackawanna.....	2.00c.
F.o.b. Birmingham.....	2.10c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham, mill lengths.....	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.....	1.90c.
F.o.b. Chicago Heights mill.....	1.90c.
Del'd Philadelphia.....	2.27c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
Del'd Cleveland.....	2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c. to 2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.05c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.35c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.05c.
F.o.b. Bethlehem.....	2.00c.
Del'd Cleveland.....	2.09c.
Del'd Philadelphia.....	1.96c. to 2.06c.
Del'd New York.....	2.09½c. to 2.14½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

Base per Lb.

6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.20c.
Bars, Buffalo.....	2.20c.
Shafting, ground, f.o.b. mill.....	2.55c. to 3.50c.
Strips, P'gh.....	2.75c.
Strips, Cleveland.....	2.75c.
Strips, del'd Chicago.....	3.05c.
Strips, Worcester.....	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
To Merchant Trade

Base per Keg

Standard wire nails.....	\$2.40 to \$2.50
Cement coated nails.....	2.40 to 2.50
Galvanized nails.....	4.40 to 4.50

Base per Lb.

Polished staples.....	2.85c. to 2.95c.
Galvanized staples.....	3.10c. to 3.20c.
Barbed wire, galvanized.....	3.05c. to 3.15c.
Annealed fence wire.....	2.55c. to 2.65c.
Galvanized wire, No. 9.....	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers).....	\$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage.....	2.40c.
Spring wire.....	3.50c.
(Carload lots, f.o.b. Chicago.)	
Wire nails.....	\$2.45 to \$2.55 (keg)
Annealed fence wire.....	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade.....	2.45c.
Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.	

Cut Nails

Per 100 Lb.

Carloads, Wheeling, Reading or Northumberland, Pa.....	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.
No. 10, blue annealed, del'd Phila.....	2.42c. to 2.52c.
No. 10, blue annealed, B'ham.....	2.35c.

Sheets

Blue Annealed

Base per Lb.

No. 13, f.o.b. P'gh.....	2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.57c. to 2.67c.
No. 13, blue annealed, B'ham.....	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c.
No. 24, del'd Philadelphia.....	3.07c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh.....	4.00c.
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Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill.....	3.50c. to 3.60c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham.....	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	3.90c. to 4.00c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.70	25-lb. coating I.C. \$15.90
15-lb. coating I.C. 13.40	30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60	40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. per Lb.		
S.A.E. Series Numbers	Alloy	Differential
2000 (¼% Nickel).....		\$0.25
2100 (1¼% Nickel).....		0.55
2300 (¾% Nickel).....		1.50
2500 (5% Nickel).....		2.25
3100 Nickel Chromium.....		0.55
3200 Nickel Chromium.....		1.35
3300 Nickel Chromium.....		3.80
3400 Nickel Chromium.....		3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....		0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....		0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....		1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....		0.35
5100 Chromium Steel (0.80 to 1.10 Chromium).....		0.45
5100 Chromium Spring Steel.....		0.20
6100 Chromium Vanadium Bars.....		1.20
6100 Chromium Vanadium Spring Steel.....		0.95
9250 Silicon Manganese Spring Steel (flats).....		0.25
Rounds and squares.....		0.50
Chromium Nickel Vanadium.....		1.50
Carbon Vanadium.....		0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.80
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1½	45	19½	1½ and ¾	+11	+36
1½ to 2	51	25½	1½	23	5
2	56	42½	¾	28	11
2½	60	48½	1 and 1½	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	12
7 and 8	56	42½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

1½	41	24½	1½ and ¾	+13	+48
1½ to 2	47	30½	1½	23	7
2	53	42½	¾	28	12
2½	58	47½	1 to 2	34	15
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	1½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2½ in..	38	1½ in.	1
2½ in.—2¾ in..	46	1¾ in.	8
3 in.	52	2 in.—2¼ in..	13
3¼ in.—3½ in..	54	2½ in.—2¾ in..	16
4 in.	57	3 in.	17
4½ in. to 6 in..	46	3½ in. to 3¾ in..	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.	61
1¼ to 1½ in..	53
1¾ in.	37
2 to 2½ in..	32
2½ to 3 in..	40
3 in.	52
3½ to 3¾ in..	48
4 in.	51
4½, 5 and 6 in..	40

Hot Rolled

2 and 2½ in..	38
2½ and 2¾ in..	46
3 in.	52
3½ to 3¾ in..	54
4 in.	57
4½, 5 and 6 in..	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40% base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Tubular Goods.—Although the season is practically at an end for both standard butt-weld pipe and heavy lap-weld material, mills are still shipping some tonnage in these lines, and December has started out to be about as good as it usually is. Large projects, which were talked about earlier in the year, will be delayed until early spring, and mills expect little further activity in line pipe for some time. Oil country demand is quiet, and as distributors' stocks in the oil fields are ample, shipments may be rather light in the next few weeks. Efforts to curtail oil production are still being watched with considerable interest by pipe makers, and some of them are hopeful that a definite program is not far in the offing. Mechanical tubing is quiet, although a few automobile makers are beginning to plan their requirements for January.

Sheets.—Specifications last week showed improvement, according to some makers, and the leading interest has scheduled its mills for a slightly better rate of operation. The last two weeks in the month may be somewhat lower, but makers are now somewhat more hopeful, and with shipments to the automobile industry at a low point, they are assured that even a slight improvement from that consuming industry would be immediately reflected in higher operating rates. Building materials made of sheet steel are normally quiet at this time of the year, but agricultural implement makers are still taking heavy tonnages, and the car builders are entering substantial orders for material for box car roofing and doors. The radio industry is taking very little sheet steel at this time, but the tonnage of electrical sheets is holding up well. Prices are still subject to some uncertainty, but the market has a firmer tone than it had two weeks ago. Black sheets seem to be fairly well established at 2.75c., Pittsburgh,

and, although some buyers insist that they have had lower quotations mills are inclined to hesitate in recognizing such competition. Blue annealed sheets and light plates are now quotable at 2.35c. and 2.20c., Pittsburgh, respectively, and with mills selling the jobbing mill product generally refusing to meet the competition of wide strip these prices are well established. On galvanized material, the 3.40c. to 3.50c. Pittsburgh, range applies to practically all the tonnage now being placed. Metal furniture sheets are now quotable at 4c., Pittsburgh, as against the recent range of 4c. to 4.10c., which places them on the same basis as automobile body sheets.

Tin Plate.—Operations this week may show some improvement, although specifications are not much heavier than they have been in the last two or three weeks. At some mills the higher operating rates are made possible by tonnage which has been allowed to accumulate, while other companies plan to suspend operations during Christmas week, and are already arranging their tonnage schedules to accommodate this. The leading interest plans to operate at above 80 per cent again this week, although the rate of independent makers is not above 65 per cent of capacity.

Strip Steel.—Although conditions in the strip industry show no general improvement, a few companies have received some fair orders from the automotive industry for January delivery and see in these the promise of improved business next month. Mill operations are still very low and intermittent. With many units closed down entirely one week and running four or five days the next, it is difficult to gage the industry's operating rate, but a fair estimate would be about 40 per cent for hot mills and 20 to 25 per cent for cold. Prices lack strength, but considered in the light of business being placed, are holding remarkably well. Efforts to take business from the regular customers of one mill by another are uncommon, and a good percentage of first quarter contracts have been signed at the regularly quoted prices. Some buyers are inclined to seek concessions, but the market is still quotable at 2.75c., Pittsburgh or Cleveland, on cold-rolled material and 1.90c. and 2c. on hot-rolled.

Cold-Finished Steel Bars.—The market is very quiet, but prices apparently are firm and operations are well accommodated to light current demand. A few automobile companies are beginning to show interest in their first quarter requirements, particularly January tonnage, and reports thus far are encouraging. The agricultural implement industry is taking a substantial tonnage. Mills are quoting 2.20c., Pittsburgh, on cold-finished bars and 2.55c. to 3.50c., mill, on ground shafting, according to size.

Coal and Coke.—Coke business is dull. Lack of sustained cold weather

is discouraging to the market for heating coke. The furnace grade is weak at \$2.65, Connellsville, but lower quotations are not frequently met and no large inquiries have come out which might lead to sharp concessions. Foundry coke shipments are still declining, and spot purchases are infrequent. Although \$3.75, Connellsville, is still the quotable minimum on 72-hr. coke, prices as low as \$3.50 are not uncommon. The market for domestic coal is slightly more active, but industrial consumption is curtailed.

Old Material.—The scrap market has a considerably better tone this week, and dealers are generally of the opinion that prices will go no lower at present. This opinion also seems to be shared by a few mills in adjacent districts, which have made some effort in the last week to buy scrap at the present low levels. In the immediate Pittsburgh district the only sale reported was that of the Pennsylvania Railroad scrap, on which the No. 1 heavy melting steel brought up to \$15.60 at a local mill. However, a considerable amount of this material was sold at prices ranging from \$15 to \$15.50, and the market on No. 1 heavy melting steel this week is much more clearly defined at \$15 to \$15.50 than it was last week. Other grades of scrap also are unchanged, but in nearly all cases the present quotations are somewhat stronger than they were a week ago. Demand for specialties continues to be heavy, and the steel wheels on the Pennsylvania list are reported to have brought \$20.25. Dealers are watching the trend of the finished steel market closely in an effort to ascertain the probable course of operations during January, and they now believe that considerable improvement will manifest itself in the first two months of the new year.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel.	\$15.00 to \$15.50
No. 2 heavy melting steel.	13.00 to 13.50
Scrap rails	14.00 to 14.50
Compressed sheet steel.	14.50 to 15.00
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels.	14.00 to 14.50
Sheet bar crops, ordinary.	17.00 to 17.50
Heavy breakable cast.	11.00 to 11.50
No. 2 railroad wrought.	15.00 to 15.50
Hvy. steel axle turnings.	15.00 to 15.50
Machine shop turnings.	10.00 to 10.50

Acid Open-Hearth Grades:

Railr. knuckles and couplers	19.50 to 20.50
Railr. coll and leaf springs	19.50 to 20.50
Roller steel wheels.	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos. mill plates.	20.50 to 21.00
Low phos. light grades.	19.50 to 20.50
Low phos. sheet bar crops	20.50 to 21.00
Heavy steel axle turnings.	15.00 to 15.50

Electric Furnace Grades:

Low phos. punchings.	18.50 to 19.00
Hvy. steel axle turnings.	15.00 to 15.50

Blast Furnace Grades:

Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00

Rolling Mill Grades:

Steel car axles.	19.50 to 20.50
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Cupola Grades:

No. 1 cast	14.00 to 15.00
Rails 3 ft. and under.	17.50 to 18.50

Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.	2.90c.
Reinforcing steel bars.	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles.	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles.	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates.	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets.	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	\$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count.	60 per cent off list
Carriage bolts, 100 count.	60 per cent off list
Nuts, all styles, 100 count.	60 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'l'd, base per 100 lb.	\$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg.	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	\$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	\$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit

Iron ore, low phos., copper free, 65 to 58% iron in dry Spanish or Algerian

Iron ore, low phos., Swedish, average 68% iron

Iron ore, basic Swedish, average 65% iron

Manganese ore, washed, 52% manganese, from the Caucasus

Manganese ore, Brazilian, African or Indian, basic 50%

Tungsten ore, high grade, per unit, in 60% concentrates

Per Gross Ton

Chrome ore, 45 to 50% Cr₂O₃, crude, c.i.f. Atlantic seaboard

Per Lb.

Molybdenum ore, 85% concentrates of MoS₂, delivered

50c. to 55c.

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt

Foundry, f.o.b. Connellsville prompt

Foundry, by-product, Chgo ovens

Foundry, by-product, New England, del'd

Foundry, by-product, Newark or Jersey City, delivered

Foundry, by-product, Phila.

Foundry, Birmingham

Foundry, by-product, St. Louis, f.o.b. ovens

Foundry by-prod., del'd St. Louis.

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines

Mine run coking coal, f.o.b. W. Pa. mines

Gas coal, 1/4-in. f.o.b. Pa. mines

Mine run gas coal, f.o.b. Pa. mines

Steam slack, f.o.b. W. Pa. mines

Gas slack, f.o.b. W. Pa. mines

Ferromanganese

Per Gross Ton

Domestic, 80%, seaboard

Foreign, 80%, Atlantic or Gulf port, duty paid

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%

Domestic, 16 to 19%

Electric Ferrosilicon

Per Gross Ton Delivered

50%

75%

Per Gross Ton

Furnace

10%

11%

Per Gross Ton

Furnace

12%

14 to 16%

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

10%

11%

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton

6%

7%

8%

9%

Per Gross Ton

10%

11%

12%

30.00 to 32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads

Ferrovanadium, per lb. contained vanadium, f.o.b. furnace

Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads

Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton

Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines

No. 2 lump, Illinois and Kentucky mines

Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid

Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines

Fire Clay Brick

Per 1000 f.o.b. Works

High-Heat Intermediate

Duty Brick Heavy Duty Brick

Pennsylvania

Maryland

New Jersey

Ohio

Kentucky

Missouri

Illinois

Ground fire clay, per ton

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania

Chicago

Birmingham

Silica clay, per ton

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.

Grain magnesite, f.o.b. Baltimore and Chester, Pa.

Standard size

Chrome Brick

Per Net Ton

Standard size

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts

Carriage bolts

Lag bolts

Plow bolts, Nos. 1, 2, 3 and 7 heads

Hot-pressed nuts, blank or tapped, square

Hot-pressed nuts, blank or tapped, hexagons

C.p.c. and t. square or hex. nuts, blank or tapped

Washers*

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts

Semi-finished hexagon castellated nuts, S.A.E.

Stove bolts in packages, F'gh.

Stove bolts in packages, Chicago.

Stove bolts in packages, Cleveland.

Stove bolts in bulk, F'gh.

Stove bolts in bulk, Chicago.

Stove bolts in bulk, Cleveland.

Tire bolts

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland

F.o.b. Chicago

Small Rivets

(1/4-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh

F.o.b. Cleveland

F.o.b. Chicago

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws

Milled standard set screws, case hardened, 80 and 5

Milled headless set screws, cut thread.

Upset hex. head cap screws, U.S.S. thread.

Upset hex. cap screws, S.A.E. thread.

Upset set screws

Milled studs

Chicago

With No Further Recession in Ingot Output, Low Point Is Believed to Have Been Reached

CHICAGO, Dec. 10.—For the first time in several weeks, ingot output in this district has held at a uniform rate, and this situation is giving rise to the thought that the low point in steel production, as gaged by consumption, has been reached. However, it must be kept in mind that consumers are unusually cautious and will take tonnage only in limited amounts for immediate use. As long as this situation lasts, a change one way or the other by users will be quickly reflected at mills, especially with rolling schedules often as close as five or six days.

Ingot output is at 65 per cent of capacity, which closely matches with this week's specifications, part of which are coming to local mills from a wider territory. Sales of finished steel continue to drag, this being especially noticeable in commitments for future delivery. Railroad purchases this week are light, but the undertone of this market is strong. One estimate made here promises that close to 14,000 cars will be purchased in the Western market in nearby months, while miscellaneous rail tonnage still to be covered is said to be not far from 100,000 tons. The buying movement in track accessories to accompany 1930 rails is not yet under way, and production of these commodities is moderate in volume.

Several indications give rise to the thought that sentiment among manufacturers of automobiles is improving. Inquiries for pig iron from this source are more numerous and releases for immediate shipment show improvement. A parts maker is asking for prices on first half needs and several others are actively in the alloy steel bar market.

Crane and shovel builders are busy, some having books well filled for four months. Both specifications and forward contracting show farm implement manufacturers to be maintaining a high rate of output, with well arranged schedules for the next few months. The arrival last week of a cargo of steel and the expected docking of a boatload of pig iron before the close of the week mark the closing of the navigation season for Lake movement of blast furnace and steel mill commodities.

Ferroalloys.—Forward contracting for ferromanganese is well under way at \$100 a ton, delivered Chicago. Commitments are being freely entered for 50 per cent ferrosilicon at \$83.50 a ton, delivered Chicago.

Pig Iron.—The feature of the local pig iron market is an improvement in sentiment, which is evidenced by new buying and specifications for iron from manufacturers of automobiles and parts. The volume of this business is not large, but it implies that a turn for the better is at hand. Demands from other sources are measurably larger, with the result that December shipments are averaging better than the November rate. This week marks the closing of navigation, as the last boatload on order docks at Milwaukee. Four charcoal iron furnaces are in blast and stocks are in moderate volume. Prices of this grade are steady at \$24, furnace, for tonnages from current make. The necessity to move some grades from stocks occasionally brings out lower quotations. A local steel mill has a tonnage

of basic to sell, but recent demand has been limited to carload lots.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail) ..	\$19.01 to 19.51
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent.....	\$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Rails and Track Supplies.—Estimates made here indicate that about 100,000 tons of standard-section rails will be purchased from local mills in the next 45 days. Much of this tonnage will be made up of miscellaneous orders from the smaller railroads. A Northwestern railroad, which normally buys 25,000 tons of rails, has still to come into the market for 1930 requirements. It is significant, according to the views of local sellers, that the total tonnage already purchased this year is measurably ahead of the requirements made known up

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel..	1.80c. to 1.90c.
Reinforc'g bars, rail steel.....	1.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (7/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter) ..	3.75c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, 7/8 in. and larger.....	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'd wire, per 100 lb...	\$3.45
Com. wire nails, base per keg.....	\$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

to this time a year ago, and it is more or less taken for granted in the local market that the total tonnage, when completed, for 1930 deliveries will show a substantial increase over the 1929 shipments. Purchases this week totaled several thousand tons in small scattered lots. The track accessory market is quiet both in sales and inquiries. The 14,000 tons needed by the New York Central is still before the trade.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—The feature of this market is the fact that public utilities are taking preliminary steps in the matter of winter buying. Although no definite inquiries are before the trade, the announcements made recently that public utility expenditures for improvements will be heavier in 1930 than in the current year lead sellers to look forward to a more active market. Chicago has taken bids on 800 tons of 6 to 12-in. pipe, and Franklin County, Ohio, will receive tenders Dec. 15 at Columbus on 15,000 ft. of 6 and 8-in. pipe. A few scattered orders for carloads have been taken for small municipalities near Chicago. Deliveries on common sizes are prompt. Prices remain steady at \$43.70 to \$45.70 a ton, delivered Chicago.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.70 to \$45.70; 4-in., \$47.70 to \$49.70; Class A and gas pipe, \$3 extra.

Sheets.—Releases of sheets have not been in sufficient volume to support output at the rate of a week ago and, as a result, production at hot mills has been revised downward to 45 per cent of capacity. Some units are running three days a week, and schedules on the whole are seldom made for more than six days in advance. Forward buying is in smaller volume than a week ago. Usually expressions of future needs come from manufacturers who have taken business and therefore have prices for their goods established. This is the situation with several barrel manufacturers and makers of roofing materials. As in recent months, the blue annealed commodity is the most active of hot mill products. Chicago delivered prices are steady at 2.90c. for black sheets, 3.55c. to 3.65c. for galvanized sheets and 2.35c. for No. 10 blue annealed.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Structural Material.—The most active field in structural steel at the moment is in power plant additions to public utility properties. Figures have been taken on a 3000-ton addition to the Public Service Co.'s plant at Waukegan, Ill., and 400 tons will be used for a similar project at Lin-

coln, Neb. Public utility engineering offices and consulting engineers who do this kind of work are busy, and several of them report that work is now being planned for more than two years. Railroad bridge purchases in recent months have been heavier than is customary in the fall, and on this score the trade feels that little more will be purchased for delivery in the early spring. Reports indicate, however, that contemplated railroad bridge work for next year will make use of a round tonnage of steel. Several large bridges are being planned by Western railroads. The only local award of note is 1800 tons for the Fine Arts Building, Chicago, on which the steel will be fabricated at a moderate rate as required for the revamping of this old structure. All shops in this district, with the exception of one or two which are beginning to fabricate large tonnages for affiliated companies, are operating at greatly reduced schedules and are eagerly seeking new work. Competition has lowered prices named by fabricators.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Bolts, Nuts and Rivets.—Contracting for the first quarter is progressing satisfactorily at unchanged prices. Specifications from the implement trade are large and steady.

Wire and Wire Products.—Little change has occurred in this market in the last week. Distribution by jobbers is in smaller volume as the winter season advances, but reports from most districts point to a substantial volume of business in the spring. Specifications from the manufacturing trade are small in the aggregate. Forward contracting is unusually slow and producers report the volume of business now on books the lowest in several years. Wire mills are engaged at 50 per cent of capacity.

Bars.—Use of mild steel bars by the general run of manufacturers is in moderate volume. Forward buying is not active and spot purchases are individually small and for prompt use. A fair part of current rollings is being taken by car builders and manufacturers of farm machinery, neither of which have cut output schedules in recent weeks. Prices for mild steel bars are steady at 2c., Chicago. Output of alloy steel bars is little above 50 per cent of capacity of local mills. Current specifications are a trifle heavier than the tonnage needed to support mill operations at the present rate. Automobile parts makers are signifying their intention of making larger use of this commodity. Demand for iron bars is steady, the bulk of the tonnage moving to car shops and railroads. Use of rail steel bars by barn equipment makers is expanding slowly. The bed industry continues to operate at a rate which is close to normal for this time of the year. Rail steel bar mills are operating at 60 per cent of capacity and deliveries are prompt. Shipments so far this

year are practically equal to the tonnage moved in the corresponding period of 1928.

Old Material.—Some support has been given to the Chicago scrap market by purchases of 15,000 to 20,000 tons of heavy melting steel for delivery at Gary. The price reported to have been paid is \$13 a gross ton, delivered. Dealers have rushed in to cover this and other orders, with the result that prices being paid on dealers' trades have risen 25c. to 50c. in the week. In some quarters the thought is expressed that the market has definitely turned upward and some brokers are inclined to go long of the market. However, consumers' interest in buying still drags, and it is definitely known that many buyers, including some large consumers, have sizable stocks on hand. The cast-iron borings market is at a standstill, with little tonnage coming on track and users' interest at low ebb. Recent sales by railroads have brought out prices of \$13.50 a gross ton, delivered, for heavy melting steel.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:

Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel.....	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings.....	9.75 to 10.25
No. 1 busheling.....	11.00 to 11.50
Forg'd cast and r'd steel carwheels.....	17.50 to 18.00
Railroad tires, charg. box size.....	17.50 to 18.00
Railroad leaf springs cut apart.....	17.50 to 18.00

Acid Open-Hearth Grades:

Steel couplers and knuckles	16.00 to 16.50
Coil springs.....	17.75 to 18.25

Electric Furnace Grades:

Axle turnings.....	12.75 to 13.25
Low phos. punchings.....	14.50 to 15.00
Low phos. plates, 12 in. and under.....	14.50 to 15.00

Blast Furnace Grades:

Axle turnings.....	10.50 to 11.00
Cast iron borings.....	9.00 to 9.50
Short shoveling turnings...	9.00 to 9.50
Machine shop turnings...	6.50 to 7.00

Rolling Mill Grades:

Iron rails.....	14.50 to 15.00
Rerolling rails.....	14.50 to 15.00

Cupola Grades:

Steel rails less than 3 ft..	16.25 to 17.25
Steel rails less than 2 ft..	18.00 to 18.50
Angle bars, steel.....	15.25 to 15.75
Cast iron carwheels.....	13.50 to 14.00

Malleable Grades:

Railroad.....	16.00 to 16.50
Agricultural.....	14.50 to 15.00

Miscellaneous:

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:

Iron angle and splice bars	15.00 to 15.50
Iron arch bars and trans- oms.....	17.50 to 18.00
Iron car axles.....	25.50 to 26.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought...	12.00 to 12.50
No. 2 railroad wrought...	10.50 to 11.00
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	7.00 to 7.50
Locomotive tires, smooth...	14.50 to 15.00
Pipes and flues.....	9.50 to 10.00

Cupola Grades:

No. 1 machinery cast.....	13.50 to 14.00
No. 1 railroad cast.....	12.00 to 12.50
No. 1 agricultural cast...	12.00 to 12.50
Stove plate.....	11.50 to 12.00
Grate bars.....	11.25 to 11.75
Brake shoes.....	9.75 to 10.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Coke.—Consumers are freely contracting for by-product foundry coke at \$8 a ton, local ovens. December shipments continue to show an increase over the rate in November.

Plates.—Formal orders have not been placed with car builders by the Rock Island and, as a result, the 75,000 tons of steel needed for these 5000 cars has not been scheduled with mills. This situation would be of little moment except for the fact that some rolling mill units in this district are urgently in need of immediate releases. About 14,000 additional cars may soon be ordered from Western shops. Of this number, about half have been formally inquired for. Local sellers of steel estimate that for the country as a whole not less than 21,000 cars are definitely planned for, and this figure does not include several large programs which have been made public, but on which actual inquiry is still some distance in the future. Among probable purchases are 5000 or more by the Chesapeake & Ohio and allied lines. Reports indicate that a substantial volume of plate business will come from oil producing centers. In the meantime, inquiries and purchases of plates for tank building are individually small and widely scattered. Local tank shops are moderately busy, but are actively seeking additional work. Fabricators in the Southwest are well engaged on old orders and a fair volume of new miscellaneous work. Deliveries are at close range on most plate mill products. Prices are steady at 2c., Chicago.

Reinforcing Bars.—This market remains quiet in awards, and only slight encouragement is afforded by a nominal increase in new tonnages being estimated. New requests for prices in November were for about one-half the tonnage normally expected in that month. Activity by architects leads sellers to anticipate a normal market soon after the turn of the year. This would mean estimates on 8000 to 10,000 tons a month, with sales approximating 70 per cent of these figures. Price structures in this market are low, and, though repeated efforts have been made to put into effect higher quotations, results so far obtained have not been successful.

Factory Earnings Lower

Average weekly earnings in representative New York State factories in October are reported at \$30.08, by the State Industrial Commissioner. This includes all employees in office and shop. It represents a recession from the \$30.47 of September, which was the highest ever recorded, but is correspondingly higher than the \$29.78 of October, 1928. No month previous to last December had ever reached \$30.

New York

Pig Iron Sales Increase, Mostly for Early Shipment—Steel Volume Shows No Gain

NEW YORK, Dec. 10.—Pig iron sales have increased, totaling 8000 tons, compared with 5000 tons in the previous week. Part of the tonnage was for spot shipment. The General Electric Co., for example, closed against an inquiry for 500 tons for Bayway, N. J., and 200 tons for Schenectady, N. Y., for early delivery. The Pequonock Foundry, Inc., Bridgeport, Conn., on the other hand, has bought 600 tons of foundry iron for first half shipment. Inquiries for about 3000 tons for first quarter are pending, but in general there are few definite requests for prices for that period, although a number of buyers have manifested some interest in tonnage for next year. Shipments to melters are declining as year-end shutdowns for inventory-taking approach. The recession is not due to suspensions, which have been exceptional, but rather to the fact that buyers are not placing additional orders to supplement those on which they have already received deliveries. Stocks on melters' yards are apparently very light. Buffalo iron is still available at \$17 to \$17.50, base furnace, for foundry grade, while Alabama foundry iron is being sold at \$13.50, base Birmingham. The trade regards a concession from the latter price a possibility on a large tonnage. The Roane Iron Co., Rockwood, Tenn., contemplates blowing out a furnace shortly.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$21.91 to \$22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Finished Steel.—Local district sales offices report that consumers are showing little interest in anticipating requirements. In view of the fact that the semi-annual inventory period is close at hand and that the price situation holds no incentive for forward buying, the dullness of the market is not surprising. Plates are fairly firm at 2c. to 2.05c., Coatesville, and bars are quoted at 1.90c., Pittsburgh. Demand for structural steel has slackened, although considerable work is pending. Much of this, however, probably will not be let until after the turn of the year. Structural awards in the metropolitan New York area, exclusive of civil engineering projects, totaled 43,905 tons in November, according to figures compiled by the Structural Steel Board of Trade. While this represents a sharp drop from the 85,699 tons in October, it is considerably larger than the 27,500 tons in November, 1928, and is a moderate gain over Novem-

ber, 1927, in which contracts were closed for 34,000 tons. A small amount of galvanized sheet business is being booked for delivery early in the first quarter at 3.40c., Pittsburgh, to large jobbers and 3.50c. to small users. Black stock is holding at 2.75c. and blue annealed at 2.35c., Pittsburgh, for No. 13 gage and 2.20c. for No. 10.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.09½c. to 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—Sales have been affected by the seasonal dullness, although considerable work is pending. Two jobs requiring 500 tons of bars each, an incinerator plant at New Haven, Conn., and a warehouse at Newark, N. J., were awarded the past week. The city of Albany, N. Y., has taken bids on 1000 tons of bars for a new waterworks. Prices are unchanged at 2.05c., New York.

Cast Iron Pipe.—Current buying of pressure pipe is still limited to car-load lots or less, and prices are irregular. Hartford, Conn., has closed on 200 tons of 12-in. water pipe with a Birmingham maker. Portland, Me., is inquiring for about 400 tons of water pipe for delivery during 1930. Northern foundries are still fairly well engaged on large sizes of pipe, with orders sufficient to maintain present operating rates beyond the first of the year. Capacity for the smaller specifications, however, is far from filled, and little new business is being booked in these sizes.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$34.60 to \$36.60; 4-in. and 5-in., \$37.60 to \$39.60; 3-in., \$44.60 to \$46.60. Class A and gas pipe \$3 extra.

Coke.—Contracts for delivery of by-product coke over the first half of next year are still being closed, but the market for prompt shipment continues quiet. The price of special brands of beehive foundry coke continues at \$4.85 a net ton, ovens, or \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. Standard furnace coke is quiet at \$2.65 a net ton, Connellsville. By-product coke is quoted at \$9 to \$9.40 a net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Warehouse Business.—The number of orders placed with jobbers continues fairly large, and in the past week individual tonnages have increased slightly. Demand for structural steel is small and the market for sheets is inactive. Quotations on black and galvanized sheets are only occasionally shaded, but blue annealed sheet prices still show a wide range.

Old Material.—Consumer buying of scrap is small and prices show a continued downward trend. Brokers have reduced their buying prices for No. 2 heavy melting steel for a

consumer at Phoenixville, Pa., to \$11.50 a ton, delivered, and are not offering more than \$13.50 a ton, delivered, for heavy breakable cast for mills at Harrisburg, Bethlehem and Coatesville, Pa., or the foundry consumer at Florence, N. J. Specification pipe is still being bought at \$13.50 a ton, delivered Lebanon, Pa., but in certain cases brokers have reduced their buying price for this de-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter	
hard.....	5.15c. to 5.40c.
Hoops.....	4.25c.
Bands.....	3.75c.
Blue ann'd sheets (No. 10).....	3.25c. to 3.90c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, ½ x ½ in. and larger....	3.40c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.75c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	
Machine bolts, cut threads:	Per Cent
¾ x 6 in. and smaller.....	Off List
1 x 30 in. and smaller.....	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.60
¾ x 20 in. and smaller.....	.50 to 50 and 10
Coach Screws:	
¾ x 6 in. and smaller.....	.60
1 x 6 in. and smaller.....	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	Per Lb.
Nos. 18 to 20.....	3.70c.
No. 22.....	3.85c.
No. 24.....	3.90c.
No. 26.....	4.00c.
No. 28.....	4.15c.
No. 30.....	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.15c.
No. 16.....	4.00c.
No. 18.....	4.15c.
No. 20.....	4.25c.
No. 22.....	4.35c.
No. 24.....	4.50c.
No. 26.....	4.75c.
No. 28.....	5.00c.
No. 30.....	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

livery to \$13 a ton. Chemical borings are off about 50c. a ton, with \$12.50 a ton, delivered to Bound Brook, N. J., usually offered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel.	\$11.00 to \$11.35
Heavy melting steel (yard)	7.50 to 8.00
No. 1 hvy. breakable cast.	9.75 to 10.50
Stove plate (steel works)	8.00
Locomotive grate bars....	8.25
Machine shop turnings....	7.00 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast fur.	
or steel works)	7.00 to 7.50
Mixed borings and turn-	
ings	6.75 to 7.50
Steel car axles	15.25 to 16.25
Iron car axles	21.00 to 21.50
Iron and steel pipe (1 in.	
dia., not under 2 ft. long)	9.25 to 9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling	11.25 to 11.75
Stove plate (foundry)....	8.25 to 8.50
Malleable cast (railroad)..	13.00 to 13.50
Cast borings (chemical)...	8.50 to 9.50
Prices per gross ton, deliv'd local found-	
ries:	
No. 1 machry. cast.	\$15.00
No. 1 hvy. cast (columns, bldg. ma-	
terials, etc.), cupola size.....	13.00
No. 2 cast (radiators, cast boilers,	
etc.)	12.50

Donner-Witherow Merger Is Consummated

Consummation of the merger of the Donner Steel Co., Buffalo, and the Witherow Steel Corporation, Pittsburgh, was authorized by Donner stockholders at a meeting in Buffalo Monday. They also authorized a change in the capital structure of the company to provide for the transaction. Stockholders of Witherow gave their approval of the consolidation late last week by the deposit of sufficient stock to carry out the terms. Combined assets of the two companies will be approximately \$34,000,000.

Sheet and Tube Takes Out Continuous Mill License

The Youngstown Sheet & Tube Co. has taken out a general license for use of the continuous rolling mill patents of the American Rolling Mill Co., marking another step by the company in plans to completely modernize its Youngstown and Chicago district properties. James A. Campbell, chairman, signed the licensing agreement this week.

This is the seventh such agreement made by the American Rolling Mill Co. with steel companies.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to 1/2 in.	
inclusive	3.25c.
Hoops and bands, No. 13 and lighter	
Cold-finished strip	3.65c.
Black sheets (No. 24).....	5.95c.
Galvanized sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).....	4.60c. to 4.75c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.65
No. 9 galv. wire, per 100 lb.....	3.00
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

Cleveland

Demand for Automobile Steel Improves, Though Volume is not Large—Mill Operations Unchanged

CLEVELAND, Dec. 10.—Quite an improvement in the demand for steel from the automotive industry in the Detroit territory developed during the week. Some good business came from that source in steel bars, sheets and hot-rolled strip. While it is still expected that it will be some time after the first of the year before the automotive industry gets back to fair operations, the production of some of the lower-priced cars is being increased slowly on the changed models.

Orders for steel from automobile makers were in such low volume for several weeks that a release of more tonnage was not surprising. While automobile manufacturers are ordering only for early requirements, some of them are beginning to show an interest in first quarter contracts.

Two of the larger car manufacturers have inquiries out for steel bar contracts covering their requirements for the quarter and two other inquiries aggregate 7500 tons. One consumer in this field has placed a contract for a fair tonnage.

Orders from consumers outside the automotive field continue very light. Consumers in all fields are reducing their stocks to a minimum for inventory time and, with exceptions noted, are showing no inclination to place first quarter contracts. Present prices have been reaffirmed on practically all steel products, but mills are doing little in the way of soliciting contracts.

Finishing mill operations in this territory show little change from a week ago. Local independent steel plants continue to operate at about 30 per cent of capacity.

Pig Iron.—Consumers are showing more interest in first quarter contracts than heretofore and inquiry has gained. Cleveland interests sold 15,500 tons of foundry and malleable iron during the week, some for early requirements, but largely for first quarter delivery. The business was well distributed among districts, but not much of it came from the automotive industry. Inquiries totaling 3000 to 4000 tons are pending in the northern Ohio territory. Some buyers are showing hesitation about placing contracts for the coming quarter, both because of uncertainty as to how much iron they will need and because they are satisfied prices will be no higher, and they see a possibility of a reduction. Shipments continue light and are not expected to show an improvement this month, as many consumers will shut down their plants for inventories in the latter part of the month and probably will discontinue taking iron. No price weakness is in evidence. Foundry and malleable iron are quoted at \$18.50, Cleveland, for out-of-town shipment and \$19, furnace, for local delivery. The Michigan market is represented by a spread of \$19.50 to \$20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	\$19.51 to 20.51
Malleable	19.50
Ohio silvery, 8 per cent....	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

Iron Ore.—The dock balance of Lake Superior ore at Lake Erie ports Dec. 1 was 6,489,612 tons, as compared with 6,454,126 tons on the same date a year ago. Receipts at Lake Erie ports during the season were 45,747,079 tons, and shipments were 32,907,221 tons. Receipts at other than Lake Erie ports, mostly South Chicago, Gary and Indiana Harbor were 18,766,379 tons, as compared with 16,484,805 tons last year.

Sheets.—With quite a little business from the automotive industry in new orders, specifications against contracts and releases of held-up material, the market was more active the past week than for some time. The orders were not for large lots and were limited to early requirements. Some automobile body sheets were placed for January shipment because of the length of time it takes to furnish this grade. Specifications from barrel manufacturers also showed a gain. Independent mills in this territory are operating at 40 to 50 per cent of capacity, or at about the recent average. No interest is being taken in first quarter contracts. Some producers have taken a firmer stand on blue annealed sheets, and jobbing mills are holding to 2.20c. for No. 10 and 2.35c. for No. 13 in widths that do not have to meet continuous mill competition. On competitive material, a \$2 a ton lower price is commonly prevailing. A quotation of 2.60c. on black sheets was made by one mill during the week for immediate specifications. Galvanized sheets are steady at 3.40c. Metal furniture sheets, about which there was some price uncertainty, are now commonly quoted at 4c. Some mills had attempted to hold to 4.10c. for the first quarter.

Bolts and Nuts.—Cleveland bolt and nut manufacturers have reestablished the present 70 per cent discount for the first quarter and reaffirmed stove bolt prices. Makers specializing on large bolts are doing much better than manufacturers of small bolts, the demand for the latter still being very dull.

Wire Products.—Concessions from the 2.40c., Cleveland, price on wire

have appeared in some sections. Leading makers are not meeting this price. Both nails and wire are very dull.

Bars, Plates and Shapes.—The volume of business in this territory continues light. Mills that have fourth quarter contracts expiring Dec. 15 will have considerable tonnage on their books to be cancelled or extended into the first quarter. Local plate mills are fairly well situated, having orders from locomotive builders. Detroit, which recently placed 1600 tons for a water pipe line, has an inquiry out for another extension requiring 2000 tons of plates. In the structural field, a local award of 1000 tons was made, but there is virtually no new inquiry. Local fabricating shops are still comfortably filled, but are reducing their backlogs. Although 1.85c., Cleveland, is being named for steel bars, outside mills are still quoting 1.90c., Cleveland. Plates and structural shapes are 1.90c., Pittsburgh. These prices are being named for the first quarter.

Coke.—Activity in foundry coke is light, being limited to specifications against contracts. Better grades of Connellsville foundry coke are unchanged at \$4.85. Ohio by-product foundry coke is \$8.25, ovens. Domestic heating coke is rather quiet following a spurt during the recent cold spell.

Rivets.—The leading local producer has reaffirmed for the first quarter present prices of \$3.10 a 100 lb., Pittsburgh and Cleveland, for large rivets and 70 and 10 per cent off list for small rivets. Specifications are only moderate.

Strip Steel.—Specifications for hot-rolled strip increased during the week. Not only were there some fair releases from the automotive industry, but a better volume of orders from other consumers, including agricultural implement and hardware manufacturers. While there are occasional reports of concessions of \$2 a ton, the market is holding rather firm at 1.90c., Pittsburgh, for wide strip and 2c. for

narrow, and these prices are being paid by some of the larger consumers. Demand for cold-rolled strip continues very slow. This product is firm at 2.75c., Cleveland and Pittsburgh.

Semi-Finished Steel.—Specifications for sheet bars picked up the past week. Orders included one for 2000 tons for prompt shipment from a manufacturer of automobile body sheets. Demand for slabs and billets continues very light. No interest is being taken in first quarter contracts. Shipments of sheet bars, billets and slabs are being made against \$35 contracts.

Old Material.—The market continues almost at a standstill. Mills in the Cleveland and Valley districts are taking very little scrap. One Cleveland consumer that for some time had been taking neither steel-making nor blast furnace scrap is now accepting limited quantities of blast furnace grades. The market is weak and untested. While car lots are moving at concessions, yard dealers are inclined to hold their stocks

until next month when they look for more activity and better prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.	\$14.00 to \$14.50
No. 2 heavy melting steel.	13.50 to 13.75
Compressed sheet steel.	13.50 to 14.00
Light bundled sheet stampings.	12.00 to 12.50
Drop forge flashings.	11.50 to 12.00
Machine shop turnings.	9.00 to 9.75
Short shoveling turnings.	11.50 to 12.00
No. 1 railroad wrought.	13.00 to 13.50
No. 2 railroad wrought.	14.00 to 14.50
No. 1 busheling.	12.50 to 13.00
Pipes and flues.	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops.	17.75 to 18.00
Low phos., billet, bloom and slab crops.	18.50 to 18.75
Low phos., sheet bar crops.	18.00 to 18.50
Low phos., plate scrap.	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings.	10.00 to 10.50
Mixed borings and short turnings.	10.00 to 10.50
No. 2 busheling.	10.00 to 10.50
Cupola Grades:	
No. 1 cast.	16.00 to 16.50
Railroad grate bars.	11.00 to 12.00
Stove plate.	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Railroad malleable.	18.00 to 18.50
Rails for rolling.	16.25 to 16.50

Philadelphia

Railroads Inquire for Steel and Pig Iron—Heavy Plate Tonnages Required For Ships

PHILADELPHIA, Dec. 10.—Steel mill operations still show a tendency to decline, with a minimum of new business being placed and only small backlogs on mill books. Prices, however, have shown no further recession, and current quotations are in most cases being announced by mills for first quarter contracts. Meanwhile, the railroads and shipbuilding are providing most of the year-end activity. Recently, eastern Pennsylvania manufacturers of refrigerating machinery have been increasing their operating schedules, and wire rope makers are busier as a result of demand from public utilities.

The Baldwin Locomotive Works has booked orders for a total of 30 locomotives, of which 26 were from railroads and four from steel companies. The Norfolk & Western and the Chesapeake & Ohio are each taking bids on 2500 tons of plates, shapes and bars for first quarter delivery, and the Seaboard Air Line is also asking prices, but does not specify the tonnage. The Atlantic Coast Line Railroad has awarded 23,000 tons of rails to the Bethlehem Steel Co.

Shipbuilding activity continues an important factor. The Tidewater Oil Co. has awarded two 13,000-ton tank ships to the Sun Shipbuilding Co.; the Lake Tankers Corporation has placed nine barges with an Eastern shipyard; the Standard Oil Co. of New Jersey, which has recently placed contracts for eight tank ships, will award four more by the end of this month, and the Grace Line is contemplating construction of one to four vessels.

Ferromanganese.—Consumers are contracting for their 1930 requirements at \$100 a ton, seaboard, and shipments on uncompleted contracts for this year are being made at the new price.

Pig Iron.—Small tonnage foundry iron inquiries for first quarter delivery are beginning to appear, but forward buying has not developed to any extent. Eastern Pennsylvania fur-

naces are generally maintaining \$20.50 to \$21 a ton, on foundry grade, with occasional concessions on desirable business. The Coatesville Boiler Works, Coatesville, Pa., is about to close on 250 tons of foundry iron for first quarter. The Norfolk & Western Railroad is inquiring for 1250 tons of No. 1, No. 2, No. 3 foundry and Bessemer malleable iron for delivery in the first quarter. The Newport News Shipbuilding & Dry Dock Co. has closed on a carload of foundry iron. Basic iron is apparently lacking in strength, a recent purchase by an Eastern consumer of about 1500 tons having been made at between \$19.50 and \$19.75 a ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.	22.26 to 22.76
Basic (del'd east. Pa.)	19.50 to 19.75
Gray forge.	20.00 to 20.50
Malleable.	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Eastern Pennsylvania consumers of bars are moderately active in buying small lots, usually of less

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes.	2.70c.
Soft steel bars, small shapes, iron bars (except bands).	2.80c.
Round-edge iron.	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished.	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats.	4.00c.
Steel hoops.	3.55c.
Steel bands, No. 12 to ⅝-in. inclus.	3.30c.
Spring steel.	5.00c.
*Black sheets (No. 24).	3.90c.
†Galvanized sheets (No. 24).	4.65c.
Light plates, blue annealed (No. 10).	3.25c.
Blue ann'd sheets (No. 13).	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails.	3.20c.
Swedish iron bars.	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

than a carload. Quotations on this business and for first quarter contracts are firm at 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—Bids have been asked for by the Pennsylvania Railroad on two slaughter houses in West Philadelphia, requiring a total of 1500 tons of bars. Prices show no improvement. Distributors claim to have been quoted 2.10c. a lb., delivered, by importers of reinforcing bars. Billet steel bars from domestic mills are quoted at 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia, with the usual extra for cutting to length omitted. Rail steel bars range from 1.80c. to 1.95c. a lb., Franklin, Pa., and Tonawanda, N. Y., or 2.12c. to 2.27c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Mills are maintaining fair rates of operation, but are booking only a small tonnage of new business. Prices are unchanged at 1.90c. to 1.95c., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia, with concessions of about \$1 a ton sometimes granted on desirable tonnages. Fabricating shops are bidding on only a small tonnage of new projects. At the opening of bids today for the general contract on the convention hall in Philadelphia, McCloskey & Co. were low.

Plates.—Current buying is limited in most cases to small lots, usually of less than a carload, but mills are quoting on some substantial tonnages of plates to shipyards, and railroad business for next year is beginning to appear. One eastern Pennsylvania plate mill has just resumed operation following a week's suspension for repairs and installation of new electrical equipment. On orders for prompt shipment and for first quarter contracts, plate mills are quoting 2c. to 2.05c. a lb., Coatesville, Pa., or 2.10c. to 2.15c., delivered Philadelphia.

Sheets.—Most consumers of sheets are still operating on restricted schedules, except for manufacturers of refrigerating machinery, which have been increasing production recently. Prices are substantially unchanged, with black sheets quoted at 2.70c. to 2.75c. a lb., Pittsburgh, or 3.02c. to 3.07c., delivered Philadelphia, and galvanized at 3.40c., Pittsburgh, or 3.72c., Philadelphia. Blue annealed sheets are quoted at 2.35c., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage, and blue annealed plates at 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 10 gage. Concessions of \$2 to \$4 a ton are granted on orders from automobile manufacturers and other preferred buyers. Mills are also quoting these prices for first quarter contracts.

Imports.—In the week ended Dec. 7, 3513 tons of chrome ore was received at this port, of which 2038 tons came from Portuguese Africa and 1480 tons from Greece. A total of 699 tons of pig iron was received, of which 499 tons came from British India and 200 tons from Sweden, and

150 tons of spiegeleisen was received from the United Kingdom. Steel arrivals consisted of 34 tons of steel rods and 13 tons of steel billets from Sweden, 24 tons of structural shapes, 24 tons of steel bands and 9 tons of steel bars from France, 82 tons of structural shapes, 50 tons of steel bands and 15 tons of steel bars from Belgium, and 509 tons of steel scrap from the United Kingdom.

Old Material.—Consumer buying of scrap is still limited to small lots, and the large users of No. 1 heavy melting steel are not in the market. Although scrap prices are generally unchanged in the absence of buying, they are lacking in strength.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$14.50 to \$15.00
Scrap T rails	14.00 to 14.50
No. 2 heavy melting steel.	12.00 to 13.00
No. 1 railroad wrought.	15.50 to 16.00
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.50 to 14.00
Hydraulic compressed, old.	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.00
Railroad grate bars	11.50 to 12.00
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast furnace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	16.00 to 16.50

More Pig Iron Imported in October

WASHINGTON, Dec. 6.—Supplying 8846 gross tons, or 63 per cent of all, British India was the chief source of pig iron imports in October, totaling 14,295 tons. Canada ranked second, furnishing 3809 tons, an unusually large tonnage from that country. It represented more than the total from Canada during the preceding nine months, which was only 3472 tons.

For the 10 months of 1929, imports of pig iron were 117,889 tons, a decrease of 996 tons from the 118,885 tons imported in the first 10 months of 1928. India supplied 53,117 tons of the 1929 imports, leading all other

countries, while the United Kingdom ranked second, with 31,903 tons. In the 10 months of 1928, the situation was the reverse, the United Kingdom being the leading source of importations, with a total of 47,254 tons, while India was second, with 42,637 tons. Netherlands was third, both years.

Moves from Building Occupied for 70 Years

The Mackintosh-Hemphill Co., Pittsburgh, has moved its general offices and engineering department from a building in that city it had occupied for 70 years. The old property, at the foot of Twelfth Street, has been sold to the Pennsylvania Railroad for terminal improvements. The company has occupied offices in the Point Building, Penn Avenue and Water Street.

This company, which has played an important role in the development of the iron and steel industry through its engineering and production work in steel plant and rolling mill equipment, traces its history back farther than 1859, when James Hemphill, Dr. W. S. Mackintosh and N. F. Hart acquired a small shop at the site just relinquished by the present company. In 1803, the Pittsburgh Foundry, the first foundry in Pittsburgh, was started by Joseph McClurg. A. Garrison & Co. succeeded to its ownership in 1865. Calvin Adams established another foundry in 1837, which successively was known as the Jarvis Adams Co. and the Pittsburgh Iron & Steel Foundries Co. Mr. McClurg and his son, Alexander, had established the Fort Pitt Works 12 years after their initial foundry venture, and in 1878 this company was acquired by James Hemphill and his partners to take care of their increasing business. The A. Garrison Foundry Co., Pittsburgh Iron & Steel Foundries Co., and Woodard Machine Co. were merged with the Mackintosh-Hemphill Co. in 1922, the Woodard company having been established by the Mackintosh-Hemphill organization six years previous at Wooster, Ohio.

All of these plants are rich in industrial history. The old Pittsburgh Foundry furnished cannon balls for Perry's fleet in 1812. The first locomotive built west of the Alleghenies was a product of the Fort Pitt Works. Civil War ordnance was made at all of the plants.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	October		10 Months Ended October	
	1929	1928	1929	1928
United Kingdom	65	7,702	31,903	47,254
British India	8,846	4,610	53,117	42,637
Germany	...	...	103	395
Netherlands	207	896	19,929	22,728
Canada	3,809	162	7,281	540
France	...	30	101	330
Belgium	...	20	184	222
Norway	1,027	280	2,888	955
Sweden	281	377	1,721	2,520
All others	60	31	662	1,304
Total	14,295	14,108	117,839	118,885

Birmingham

Pig Iron Buying Slow—Steel Backlogs Aided by Railroad Buying—Scrap Market Dull

BIRMINGHAM, Dec. 10. — Neither buyers nor sellers in this district seem to be much interested in first quarter iron. A few of the smaller consumers in the district have offered to buy first quarter iron, but furnace interests have not opened their books. In general, the unshipped balance of fourth quarter contracts is more than ample for the remainder of the month, and buying is expected to be small when books are opened for the new period. Books were opened three weeks ago at \$14 to \$14.50 for first quarter iron in competitive territories, and small tonnages from these districts are coming in. District prices remain on the basis of \$14.50, Birmingham, for No. 2 foundry iron. Sixteen furnaces are active, the same as in the past three weeks. Of this number, nine are on foundry iron, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$14.50
No. 1 fdy., 2.25 to 2.75 sil.....	15.00
Basic	14.50

Finished Steel.—It is estimated that backlogs of one of the larger companies are slightly better than they were 30 days ago, exclusive of new rail orders, and operations are equally as high. Decreases in some lines have been offset by increases in others. A feature of the market has been the well sustained demand for bars and plates. Railroad accessories have played an important part in maintaining backlogs. The lighter demand for sheets and wire products is attributed largely to the desire to reduce inventories. All prices are the same as last week. Of the 120,000 tons of rails ordered by the Southern Pacific, 30,000 tons will be rolled by the Tennessee company. The only order of importance for fabricated structural steel is 500 tons for a Southern Railway bridge at Augusta, Ga., booked by the Virginia Bridge & Iron Co. Several important projects are in prospect for early next year, including an office building and a hotel at Atlanta, each of 18 stories, and a 30-story hotel at Mobile, Ala. The Tennessee company is operating eight out of nine open hearths at Ensley, an increase of one, and six out of eight at Fairfield. The Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—The United States Pipe & Foundry Co. is reported to be low bidder on a large part of the 6500-ton project at Detroit, for which bids were opened last week. This company shared with the McWane Cast Iron Pipe Co. an order for several hundred tons of small sizes of pipe for Dallas, Tex. New bids are to be asked on upward of 2000 tons of large diameter pipe. Bids were opened last week and contracts are

pending on projects at Memphis, Tenn., and Richmond, Va., totaling about 1400 tons. Inquiries from municipalities for their 1930 requirements are more numerous. Plant operations are at the low point of the year, averaging under 60 per cent in some cases. Makers continue to maintain base prices of \$37 to \$38 for 6-in. and larger sizes.

Old Material.—Sales declined considerably last week. Foundries have

issued instructions to hold up shipments until after the inventory period. The larger mills continue to take some steel scrap, and this is about the only activity in the market. Prices on steel grades are softer, though quotations are unchanged. Iron scrap is too dull for prices to be well defined.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap steel rails.....	14.00
Short shoveling turnings..	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought...	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Buffalo

Further Reduction of Active Blast Furnace Capacity in District—Steel Mill Operation Unimproved

BUFFALO, Dec. 10.—The pig iron market is quiet, although several medium-sized inquiries have come out, including one for 300 tons of foundry, one for 500 tons, and one for 600 tons, and there have been several orders of similar size. There have been some inquiries for the first quarter, but no real buying as yet. The Hanna Furnace Co. has taken another furnace out of blast, leaving two in operation, one of which is on silvery. It is reported that one of the Donner stacks may go out of blast soon. Shipments on old orders are very good and all of the business being taken is for spot delivery. Melters in various sections of the country appear to be anxious to obtain their iron on schedule and even ahead of schedule, with the result that furnace stocks are continuing to decrease.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$19.50
No. 2X fdy., sil. 2.25 to 2.75.....	20.00
No. 1 fdy., sil. 2.75 to 3.25.....	21.00
Malleable, sil. up to 2.25.....	20.00
Basic	\$17.00 to 18.00
Lake Superior charcoal.....	27.28

Finished Steel.—No increase is noted in the operation of Buffalo mills. The Lackawanna plant of the Bethlehem Steel Co. is operating 10 of its 24 open-hearths. Several of its mills are down and the rest are on single turn, with an average operation of 40 to 45 per cent. The Donner Steel Co. operation remains the same, with three open-hearths going four days a week. The Seneca Iron & Steel Co. is operating at approximately 40 per cent. The Wickwire-Spencer Steel Co. is operating three of four open-hearths, and the Gould Coupler Co. is operating three of four basic and one acid furnace. Fabricated structural steel lettings include 150 tons for an addition to the plant of the Carborundum Co., Niagara Falls, N. Y., and 300 tons for an Elmira school.

Old Material.—A purchase of No. 1 heavy melting steel at \$14 by the largest interest in the district was made the past week. An inquiry is

out for 500 tons of stove plate. Otherwise, the market is quiet, though some steel car axles have been sold at \$16.50 to \$17, and there have been a few scattered sales of knuckles and couplers, coil and leaf springs and rolled steel wheels at \$18 to \$18.50. One of the largest consumers in the district continues to suspend incoming shipments entirely.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$14.00 to \$14.50
No. 2 heavy melting steel.....	12.50 to 13.00
Scrap rails	14.75 to 15.25
Hydraul. comp. sheets.....	12.50 to 13.00
Hand bundled sheets.....	10.50 to 11.00
Drop forge flashings.....	12.50 to 13.00
No. 1 busheling.....	12.50 to 13.00
Hvy. steel axle turnings.....	12.50 to 13.00
Machine shop turnings.....	8.00 to 8.50
No. 1 railroad wrought...	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers.....	17.00 to 17.50
Coil and leaf springs.....	17.00 to 17.50
Roller steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings.....	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles.....	16.50 to 17.00
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast.....	14.50 to 15.00
Stove plate	12.00 to 12.25
Locomotive grate bars.....	10.00 to 10.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels.....	11.50 to 12.00
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.00 to 12.50

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

St. Louis

Pig Iron Melters Hold Purchases at a Minimum—Scrap Shipments Still Sharply Restricted

ST. LOUIS, Dec. 10.—The pig iron market continues quiet. Buying for immediate shipment is especially light, as melters are holding down their inventories of raw materials as much as possible. Only slight active interest is being taken in first quarter business. Heavy purchases made in the early fall and a falling off in the melt, especially among the stove foundries here and at Belleville and Quincy, indicate that some melters will carry over pig iron into the new year. Some melters, too, are said to be hesitant in placing orders for first quarter shipment because of uncertainty over the price situation. However, makers are optimistic and believe the turn of the year will bring a marked improvement in buying. Purchases of the week are reported to be less than 2000 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25,	
f.o.b. Granite City, Ill.	\$19.50 to \$20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Old Material.—The three largest district consumers of steel scrap still ask that shipments against contracts be withheld, while the railroads are urging the dealers to take material that has been purchased to fill contracts. Dealers are taking railroad shipments, and either are laying them down in their yards or finding other outlets at losses. Prices generally are unchanged because of an absence of sales. The only change is in machine shop turnings, which are off 50c. Railroad lists: Wabash, 3865 tons; Chicago, Rock Island & Pacific, 200 carloads; Great Northern, 49 car-

loads; St. Louis-San Francisco, 26 carloads; Chicago & Western Indiana, 17 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.00 to \$13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay, rails 60 lb. and under	20.50 to 23.50
Relay, rails 70 lb. and over	26.50 to 29.00

8000 tons each, while bridge construction in that district will involve about 12,000 tons of steel. Other substantial tonnages are pending for Western cities. Taken as a whole, the prospective structural demand will call for upward of 50,000 tons, and much of this will be closed before spring.

Old Material.—A temporary flurry brought a better demand for iron and steel scrap during the week. The improvement was confined to iron grades and was due to the fact that a number of hand-to-mouth buyers were forced into the market for immediate requirements. Some of the large consumers appear to be getting ready to place first quarter contracts. Dealers have made no revision in prices.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$10.00	\$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast		17.00
Stove plate		13.00
Standard carwheels		16.00
Malleable		13.00
	Per Net Ton	
No. 1 mach'ry cast	\$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Canada

Large Structural Steel Demands Expected

TORONTO, ONT., Dec. 10.—Blast furnace representatives have opened their books for first quarter business, but so far there have been only small bookings. Local representatives look for good business to start in about a week or ten days. Spot buying is holding at a satisfactory level. The melt is unchanged at an average of better than 80 per cent. Pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	\$33.50
Carron	33.00

Structural Steel.—Deliveries against contract are responsible for continued activity among fabricating plants in Canada. Although the demand at the moment is off, with only small tonnages being closed, large tonnage business is in prospect for closing early in the new year. Several large structures have been announced in Montreal, for which about 15,000 tons of steel will be required. In British Columbia, two or three large buildings will require 3000 to

New Sheet Mill to Be Built Near Pittsburgh

The Tarentum Steel Corporation, organized several months ago in Pittsburgh, will begin the construction of a new steel plant at Tarentum, Pa., soon after Jan. 1, according to an announcement of V. L. McClay, secretary. The mill is to be erected on the site of the old No. 2 plant of the Pittsburgh Plate Glass Co., and work of dismantling the old buildings is rapidly being completed. The new plant is to contain six complete sheet mills and will have an annual capacity of 55,000 to 65,000 tons of full finished sheets.

Ray P. Farrington, formerly vice-president and treasurer of the Heintz Mfg. Co., Philadelphia, is president of the Tarentum Steel Corporation; William Cole is vice-president in charge of operation, and Frank Irvine, treasurer.

The M. M. Rivard Co., Gumbel Building, Kansas City, Mo., has been appointed sales representative for western Missouri and Kansas by the Bradley Washfountain Co., Milwaukee. L. M. Bartlett Co., 286 Baker Building, Minneapolis, has been placed in charge of sales in Minnesota, North Dakota and that section of Wisconsin tributary to the Twin Cities.

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	\$3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Cincinnati

Pig Iron Sales Decline Further but First Quarter Inquiries Appear—Scrap Dull and Weak

CINCINNATI, Dec. 10.—Although the district demand for pig iron slackened still further last week, the receipt of two sizable inquiries for first quarter contributed some optimism to the market. The larger inquiry is from an unnamed railroad for 1250 tons and the other is from a central Ohio consumer for 500 to 1000 tons. Total sales last week were approximately 1850 tons, of which 300 tons was silvery, bought by a Michigan consumer. Since district users of pig iron have been purchasing in hand-to-mouth proportions during this quarter and have accumulated no inventories, it is expected that the demand will improve after the first of the year, when buyers will be forced into the market to supply their needs. Prices on both Northern and Southern iron are being well maintained.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$19.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25.. 17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75.. 18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25. 17.69 to 18.19
S'th'n Ohio silvery, 8 per cent 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—The sheet market recovered slightly last week from the recession of the preceding three weeks. While output has not been advanced beyond 50 to 55 per cent of normal operation, the demand last week exceeded the present production schedules.

Old Material.—With mills still curtailing shipments of scrap and new business quiet and small, dealers are bidding more closely on all grades than they did a week ago and are of-

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. round and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.85
Cement c't'd nails, base 100 lb. keg.....	2.85
Chain, per 100 lb.....	8.75
Net per 100 Ft.	
Lap-weld steel boiler tubes, 2-in.....	\$16.50
4-in.....	34.50
Seamless steel boiler tubes, 2-in.....	17.50
4-in.....	36.00

fering 25c. less on heavy melting steel and No. 2 wrought and 50c. less on cast iron carwheels. The Southern Railway and the Chesapeake & Ohio are offering their usual lists. The Louisville & Nashville has sent out a list of 6500 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$12.00 to \$12.50
Scrap rails for melting.....	13.00 to 13.50
Loose sheet clippings.....	8.00 to 8.50
Bundled sheets.....	10.75 to 11.25
Cast iron borings.....	8.25 to 8.75
Machine shop turnings.....	8.00 to 8.50
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	6.50 to 7.00
Rails for rolling.....	13.50 to 14.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 2 railroad wrought.....	12.00 to 12.50
Short rails.....	17.50 to 18.00
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast.....	10.00 to 10.50
Stove plate.....	10.00 to 10.50
Brake shoes.....	10.00 to 10.50
Agricultural malleable.....	14.00 to 14.50
Railroad malleable.....	15.00 to 15.50

better. The average for bars is improved slightly by the somewhat higher rate of the Steel Corporation subsidiary. Tin mills average about 60 per cent, with increases in prospect before the end of the month. Local steel consumers are largely responsible for the maintenance of steel output at present levels, as little or no steel is now going to the automobile industry.

Sheet prices have a better tone in this district, although competition from other centers is still a threat to the existing schedules. Blue annealed sheets and light plates are again established at 2.35c. and 2.20c., Pittsburgh, respectively, but wide strip mills are quoting \$4 a ton less, with jobbing mills making no efforts to meet this competition. Black sheets are still at 2.75c., Pittsburgh, although some buyers report lower quotations. In fact, if the reports of buyers are to be given full credence, lower quotations are being made on many products, but mills are usually unable to trace such statements and in the meantime are making no efforts to push first quarter buying. Automobile

body and metal furniture sheets are holding at 4c., Pittsburgh, and the 4.10c. quotation on the latter has not disappeared. On galvanized sheets, 3.40c. seems to be the minimum, and 3.50c. is the general quotation on first quarter tonnage. Bars are unchanged at 1.90c., Pittsburgh, although a Cleveland mill is reported to be making lower quotations on some business in this territory. Prices on strip steel are subject to pressure, but the regular quotations are not seriously threatened.

On primary materials, the price situation is not essentially changed. Sheet bars apparently are settling to \$34, Pittsburgh or Youngstown, but mills are currently quoting \$35 in the face of lack of first quarter buying. Billet and slab prices are also nominal and have not been established at lower levels by actual sales. One seller of merchant pig iron has opened first quarter books at unchanged prices, or \$18.50, Valley, on basic and foundry iron, and \$19 on Bessemer and malleable. The market is very quiet. Scrap prices are still settling, with No. 1 heavy melting steel quotable around \$15 and hydraulic compressed sheets at 50c. less.

Boston

Pig Iron Sales Small, Scrap Market Dull

BOSTON, Dec. 10.—Pig iron sales the past week were confined to scattered lots, a majority of them at, or the equivalent to, \$17.50 to \$18 a ton, Buffalo, for No. 2X. Foundries say customers are holding up orders, and many foundries are melting considerably less iron than they were a month ago. It is estimated at least 70 per cent of foundries have sufficient iron on hand or on order to carry them past Jan. 1. Textile machinery

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Youngstown

Better Buying Expected from Automobile Makers

YOUNGSTOWN, Dec. 10.—Sentiment in the steel industry here is considerably better than it was last month. The automotive industry is beginning to show interest in its January requirements, and reports from the Michigan companies are encouraging. New orders and specifications have shown no increase, but there has been no further decline in tonnage releases and mill operations are on a more even keel. Ingot operations are at a very low point, as less than 20 of the 53 available open-hearth furnaces in the district were operated all of last week. However, the Ohio laws provide for a tax on year-end raw materials' inventories, and steel makers might be expected to reduce reserve tonnage to a minimum at this time. Operations of finishing mills are at a better rate, with sheet and strip mills operating at 40 to 50 per cent of capacity and bar pipe mills averaging slightly

manufacturers, now the largest consumers of pig iron in New England, have slowed up. All of them recently purchased large tonnages of Alabama iron and will require only small tonnages for mixture purposes during the next three months. A Massachusetts heater manufacturer has indicated iron will be bought before Jan. 1, but the tonnage is not specified.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91 to \$22.91
*Buffalo, sil. 2.25 to 2.75..	21.91 to 22.91
East Penn., sil. 1.75 to 2.25..	22.65 to 23.15
East Penn., sil. 2.25 to 2.75..	23.15 to 23.65
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	24.11
*Ala., sil. 2.25 to 2.75.....	24.61
†Ala., sil. 1.75 to 2.25.....	20.25
†Ala., sil. 2.25 to 2.75.....	20.75

Freight rates: \$4.91 all rail from Buffalo; \$3.65 all rail from eastern Pennsylvania; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Old Material.—Pennsylvania steel mills are holding up what few orders shippers have in hand, and the scrap market is exceptionally quiet. There is a market for steel turnings or steel mill borings at \$6 to \$6.10 a ton, on cars shipping point, but comparatively little of these materials is available. A Worcester, Mass., steel mill is taking small scattering tonnages of long bundled skeleton at \$10.50 a ton, delivered, for which brokers are paying \$8 to \$8.50, on cars. A steamer is scheduled to leave here this week with 3000 tons of scrap for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.50 to \$10.00
Scrap T rails.....	9.00 to 9.75
Scrap girder rails.....	8.50 to 9.00
No. 1 railroad wrought.....	10.50 to 10.75
No. 1 yard wrought.....	9.50 to 10.00
Machine shop turnings.....	5.50 to 6.10
Cast iron borings (steel works and rolling mill).....	6.00 to 6.10
Bundled skeleton, long.....	8.25 to 8.50
Forge flashings.....	8.00 to 9.00
Blast furnace borings and turnings.....	5.50 to 6.00
Forge scrap.....	5.50 to 9.00
Shafting.....	13.50 to 14.00
Steel car axles.....	15.00 to 15.50
Wrought pipe 1 in. in diameter (over 2 ft. long).....	8.50 to 9.00
Rails for rolling.....	10.50 to 11.00
Cast iron borings, chemical.....	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.25
No. 2 machinery cast.....	13.00 to 13.25
Stove plate.....	11.00 to 11.50
Railroad malleable.....	18.50 to 19.00

German Hardware Makers Assured Bounties

HAMBURG, GERMANY, Nov. 18.—Certain German hardware manufacturers have entered into private export bounty agreements with the steel producers, the agreements to become effective if the German steel cartels are not renewed. The manufacturers of hardware regard such arrangements essential to the maintenance of their export trade, while the steel mills are willing to pay the export bounties as a means of preventing manufacturers from buying Belgian or Luxembourg steel, on which they pay no duty if the finished product is exported.

Fabricated Structural Steel

Awards Total 35,000 Tons—Largest Inquiry Is For 18,700 Tons For New York Subway

CONTRACTS were placed in the past week for 35,000 tons of fabricated structural steel, of which 20,000 tons will go into buildings for non-industrial purposes and 11,000 tons into the construction of bridges. The largest awards were 6270 tons for a railway bridge at Cincinnati and 6000 tons for a hotel addition at Toronto. A New York subway section, needing 18,700 tons of steel, accounts for about three-fifths of the new work, totaling 31,000 tons, which came out for bids during the week. Awards follow:

WATERTOWN, MASS., 175 tons, Hood Rubber Co. vulcanizing plant, to A. L. Smith Iron Works.

BOSTON & ALBANY RAILROAD, 150 tons, power house in Allston District, Boston, to Eastern Bridge & Structural Co.

INWOOD, VT., 1000 tons, bridges for Connecticut River Power Co., to McClintic-Marshall Co.

NEW YORK, 700 tons, apartment building at 865 First Avenue, to Paterson Bridge Co.

NEW YORK, 4500 tons, addition to City Bank Farmers Trust Co., to McClintic-Marshall Co.

EDGEWATER, N. J., 445 tons, Ford assembly plant viaduct, to McClintic-Marshall Co.

EASTON, PA., 700 tons, building for Lehigh Telephone Co., to Bethlehem Construction Co.

LANCASTER, PA., 800 tons, telephone building, to Shoemaker Bridge Co.

STATE OF MARYLAND, 150 tons, highway bridge, to Dietrich Brothers.

ELMIRA, N. Y., 300 tons, school, to Kellogg Structural Steel Co.

JERICHO, N. Y., 700 tons plates, tanks for Jericho Water District, to Pittsburgh-Des Moines Steel Co.

NIAGARA FALLS, N. Y., 135 tons, addition to plant of Carborundum Co., to McClintic-Marshall Co.

TORONTO, 6000 tons, addition to Royal York Hotel, to Dominion Bridge Co.

LANSING, MICH., 345 tons, Grand River bridge for city, to Bethlehem Steel Co.

LANSING, 700 tons, R. E. Olds Bank, to R. C. Mahon Co.

CLEVELAND, 1000 tons, Severance Hall, to Massillon Bridge & Structural Co.

CINCINNATI, 6270 tons, White River bridge for Cincinnati Union Railway, to American Bridge Co.

PITTSBURGH, 900 tons, building for McCann & Co., to American Bridge Co.

BATON ROUGE, LA., 450 tons, river crossing towers for Baton Rouge Electric Co., to American Bridge Co.

FORT WAYNE, IND., 250 tons, building for General Electric Co., to American Bridge Co.

SPRINGFIELD, ILL., 350 tons, Monarch Tractor Co. building, to Illinois Steel Bridge Co.

CHICAGO, 300 tons, building for Mundelein College, to Hansell-Elcock Co.

CHICAGO, 1800 tons, Fine Arts building, to Hansell-Elcock Co.

CHICAGO, 536 tons, North Dearborn Street substation for Commonwealth Edison Co., to McClintic-Marshall Co.

PEORIA, ILL., 400 tons, highway bridge, to Continental Bridge Co.

CHICAGO, BURLINGTON & QUINCY, 400 tons, bridge work, to Vierling Steel Works, Chicago.

ST. PAUL, 1815 tons, Third Street viaduct, to St. Paul Foundry Co.

MILWAUKEE, 700 tons, plates, tanks for Milwaukee County, to Pittsburgh-Des Moines Steel Co.

LINCOLN, NEB., 400 tons, power house, to Pittsburgh-Des Moines Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 6800 tons, convention hall, low bidder for general contract, McCloskey & Co., Philadelphia.

MIDDLETOWN, CONN., 250 tons, foundry and boiler house.

CAMBRIDGE, MASS., 100 tons, Jordan & Marsh storage warehouse addition.

NEW YORK, 2000 tons, apartment building at Central Park West and Sixty-sixth Street.

BROOKLYN, 18,700 tons, subway, Route 109, Section 3.

BALTIMORE, 4000 tons, postoffice.

CHICAGO, 100 tons, dock house at Sixteenth Street and Chicago River.

STATE OF MICHIGAN, 168 tons, two bridges for State Highway Department.

HASTINGS, MINN., 400 tons, highway bridge.

ST. PETER, MINN., 400 tons, highway bridge.

ST. LOUIS, 1400 tons, factory for Steel Frame House Co.

SAN ANTONIO, TEX., 4500 tons, Army Air Service, hangars for Randolph Field; bids to be asked.

Central Alloy Formally Takes over Interstate

Acquisition of the Interstate Iron & Steel Co., Chicago, by Central Alloy Steel Corporation, Massillon, Ohio, has become effective with the transfer of Interstate assets, it is announced by F. J. Griffiths, chairman of Central Alloy. Work of coordinating sales and production activities of the two companies will begin at once, Mr. Griffiths said.

With the acquisition of the Interstate properties, assets of Central Alloy Steel Corporation are increased approximately \$17,000,000 to a total of more than \$92,000,000. Total ingot capacity of the Massillon company will be 1,938,000 tons, including an addition of 396,000 tons representing Interstate's capacity. Interstate has three plants in East Chicago. Its properties include over 300 acres and one mile of frontage on the Calumet River.

Creative Spending Is Urged by Charles F. Abbott

It is no extravagance to spend money largely, but rather it is wasteful to be penurious, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, in an address before the New England Foundrymen's Association at Boston Dec. 11. Industrial and commercial success, he said, has been predicated upon a courageous expenditure of funds and a willingness to be generous in all worthy efforts.

"We are discarding the old economic idea that business is limited," said Mr. Abbott. "We are rationalizing our industrial output in accordance with the ability of consumers to buy and are improving the consumer's purchasing powers. It is just as much industry's duty to make markets as it is to make goods."

"We must lift up an entire industry toward a higher average in tools, methods and business principles. We are willing to spend money to accomplish it—a great deal of money, individually and collectively. That is courageous and creative spending, the statesmanship of consumption and genuine progress."

"We are doing a greater and better job in advertising than we ever dreamed of doing in the old days," he said. "It is costing more money, but it is breaking down resistance, promoting bigger things because it is genuinely creative spending. The technical and industrial field is rapidly coming into the bigger sphere of usefulness, and he is a bold man who can predict where this era will end."

Factory Migration in Illinois

Forty-six cities in Illinois reported a gain of 261 plants and 13,411 employees between 1926 and 1927, according to a summary reported by the Illinois Manufacturers' Association, which compiled data from a nation-wide cooperative survey made by the civic development committee of the National Electric Light Association and the policyholders' service bureau of the Metropolitan Life Insurance Co.

This report shows that 193 were new plants, employing 5360 persons.

Twenty-five were branch plants, employing 5391 persons and 43 were relocations, with 2660 employees. Of the 43 relocations in Illinois, 25 were from within the State, seven were from other States in the same section and eleven were from other sections of the United States.

The most frequently occurring reasons for the plant location in a definite place in the east-north central region, which includes Ohio, Michigan, Indiana and Wisconsin, as well as Illinois, were given as follows: market, transportation, labor materials, living conditions, available factory buildings, financial aid or investments, and near related industries.

Allis-Chalmers Mfg. Co. Has Large Unfilled Orders

Directors of the Allis-Chalmers Mfg. Co., West Allis, Wis., have placed the common stock on a \$3 annual basis by declaration of a quarterly dividend of 75c. The previous annual payments were \$2 per share. Unfilled orders of the company as of Nov. 30 totaled \$13,600,000, as compared with \$9,681,000 Jan. 1, 1929.

Steel Corporation's Orders Gain 38,783 Tons

For the third successive month a gain was reported for November in the unfilled orders of the United States Steel Corporation. It was small at 38,783 tons and compares with 183,981 tons in October and 244,370 tons in September. These three increases contrast with decreases in the previous four months. The total on Nov. 30 was 4,125,345 tons, as against 4,086,562 tons on Oct. 31. A year ago, or on Nov. 30, 1928, the unfilled orders were 3,673,000 tons.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
November ..	4,125,345	3,673,000	3,454,441
October ..	4,086,562	3,751,030	3,341,000
September ..	3,902,581	3,698,368	3,148,113
August ..	3,658,211	3,624,043	3,196,037
July	4,088,177	3,570,927	3,142,014
June	4,256,910	3,637,000	3,053,246
May	4,304,167	3,416,822	3,050,941
April	4,427,763	3,872,133	3,456,132
March	4,410,718	4,335,206	3,553,140
February ..	4,144,341	4,398,189	3,597,119
January ..	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December ..	3,976,712	3,972,874	3,960,696

Austin Co. Plans Large Expansion Program

A widely increased program of activity both here and abroad, including a 20 per cent increase in its advertising budget over last year, will be undertaken in 1930 by the Austin Co., industrial engineer and builder, W. J. Austin, president, announced, following a convention in Cleveland attended by 75 district managers and sales engineers of the company from 16 cities throughout the country. The consensus of opinion of the members of the Austin managers was that 1930 will be a year of unusual building activities.

Among the new departures contemplated by the company in 1930 are these:

An extension of Austin activities into other European countries than Russia, in which reviving industries are anxious to adopt American industrial methods. This will be in addition to \$40,000,000 contract for a complete automobile plant and model industrial city at Nishni Novgorod, Russia.

The extension of technological specialization by experts of the company from some half a dozen industries to more than a score of industries in the United States.

An increase of 20 per cent in advertising in newspapers and other mediums to take advantage of the increased industrial building opportunities which delegates to the convention predict in their districts for 1930. Mr. Austin indicated that if the necessity arose a still further increase would be made.

George A. Bryant, Jr., executive vice-president of the company, who last summer carried on the negotiations with the Soviet Government, said there were opportunities for American construction and industrial methods in other European countries, particularly Germany. He also intimated that the company had additional work in prospect in Russia.

Acme Steel to Increase Strip Steel Capacity

Directors of the Acme Steel Co. have voted a stock dividend of 25 per cent. This action will be subject to approval by stockholders of a proposed increase in capital stock from 300,000 to 500,000 shares.

The Acme Steel Co. is closing the most prosperous year in its history, according to a statement issued by James E. MacMurray, chairman of the board. During 1930 the company will install machinery to increase further the manufacture of strip steel. During the present year the company has installed new hot mill and a heavy four-high train of cold mills which will increase the plant output by 25 per cent.

Locomotive, Coal and Other Statistics

	November, 1929	October, 1929	November, 1928
Locomotives shipped (a)	95	96	35
Locomotives shipped, eleven months ..	783	.....	506
do. unfilled orders	398	423	.....
Bituminous coal mined, net tons (b) ..	45,500,000	51,235,000 (c)	46,788,000
Anthracite mined, net tons (b)	6,037,000	5,332,000 (c)	7,322,000
Beehive coke made, net tons (b)	427,900	470,200	427,000
	October, 1929	September, 1929	October, 1928
Enameled sheet-metal ware shipped (a) :			
Dozens of pieces	371,292	338,169	417,387
Value	\$1,538,021	\$1,414,995	\$1,650,657

(a) United States Department of Commerce. (b) United States Bureau of Mines. (c) Two extra working days, compared with either November.

Non-Ferrous Metal Markets

Copper Firmer But Inactive —Tin Very Dull—Lead Steady—Zinc Easier

NEW YORK, Dec. 10.

Copper.—Statistics for November will be published Thursday, Dec. 12, and the trade expects a large increase in stocks of refined metal. Practically the only buying is by foreign consumers, and this has ranged from 500 to 1000 tons a day, a small amount. It is estimated that consumers abroad have bought since Dec. 1 only about 14,000 tons, which is no more than half of what may be considered their present requirements. In November the sales were 32,000 tons and in October about 40,000 tons. Purchases are all hand-to-mouth, with metal afloat taken as soon as it arrives. There is even some demand for copper from warehouses over there. In the domestic trade, there is a little buying each day, but it is unimportant. This also is of a hand-to-mouth character and for immediate shipment. Curtailment at the mines is proceeding, but definite information as to the extent is difficult to obtain. It is admitted, however, that reduction of output is anywhere from 25 to 40 per cent, depending on the company. The effect of this will not be apparent for two or three months. It is evident that there is less expectation of a reduction in the price and there is less talk about it than there was recently. Quotations are firm at 18c., delivered in the Connecticut Valley, for electrolytic copper and 18.30c. c.i.f. usual European ports. Lake copper is very dull but unchanged at 18 to 18.12½c., delivered.

Tin.—Demand for tin is at low ebb. Consumers are considered as being well covered and are not doing any nearby buying. Because of approaching inventories, there is a disinclination to increase stocks. The only news feature is the advance this week in the London market. Quotations yesterday were up £4 5s. a ton and today there was an additional advance of £3 10s., so that quotations today were £181 for spot standard, £184 5s. for future standard and £184 10s. for spot Straits, all considerably higher than a week ago. These advances are said to be due to propaganda emphasizing a probable worldwide curtailment of output and also a report that the Federated Malay States have ordered a six-day week. Demand in this market is very light today and spot Straits tin is quoted at 39.62½c., New York, the advance

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 10	Dec. 9	Dec. 7	Dec. 6	Dec. 5	Dec. 4
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.62½	39.25	....	38.25	38.37½	38.87½
Zinc, East St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York.....	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis.....	6.10	6.10	6.10	6.10	6.10	6.10
Lead, New York.....	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation: price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	23.25c.
Copper, hot rolled	26.75c.
Zinc	10.50c.
Lead (full sheets).....	10.00c.
Seamless Tubes—	
High brass	23.25c.
Copper	29.25c.
Rods—	
High brass	21.25c.
Naval brass	24.00c.
Wire—	
Copper	19.87½c.
High brass	23.75c.
Copper in Rolls	26.75c.
Brazed Brass Tubing.....	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	23.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes.....	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass.....	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.75c. to 11.25c.
Zinc sheets, open.....	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	41.50c. to 42.50c.
Tin, bar	43.50c. to 44.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig.....	7.00c. to 7.50c.
Lead, bar	9.00c. to 9.50c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)...	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½.....	27.50c. to 28.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	45.00c.
Tin, bar	47.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.00c. to 7.20c.
Lead, bar	9.25c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.00c.
Babbitt metal, high grade	47.50c.
Solder, ½ and ½.....	29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.25c.	12.25c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings..	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum.....	11.00c.	13.00c.
Cast aluminum.....	10.00c.	12.00c.

over recent prices being due to the effect of the London quotations.

Lead.—This is the most active market, but even so the quantity turned over is not large. There have been fair purchases for delivery this month and some inquiry for January, but commitments are limited to material that can be consumed this month so as to keep inventories low. The market at St. Louis is firm at 6.10c. and the contract quotation of the leading interest is unchanged at 6.25c., New York.

Zinc.—Conditions have changed little and buying is of a hand-to-mouth order. There is some slab zinc available under the quotation of most of the producers, but the quantity is limited. In fact, there is scarcely enough business to test prices, which are 6c., East St. Louis, or 6.35c., New York, the metal at concessions being available at 5.90c., East St. Louis. The ore price is unchanged at \$38, Joplin. Although production is comparatively low, it is regarded as in excess of demand and the situation is unsatisfactory for both miners and smelters. The opinion is expressed that a further reduction in price is probable.

Antimony.—In a dull market

Chinese metal for spot and future delivery is quoted at 8.62½c., New York, duty paid, unchanged from last week.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. a lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Dec. 10.—Demand for non-ferrous metals, though scattered and in small lots, is more active than a week ago. Prices for tin and lead are higher while quotations on zinc are lower. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 40.75c.; lead, 6.20c.; zinc, 6c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 22c.; block tin, 32c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

up their freight carr requirements and are expected to issue an inquiry shortly for about 13,000 cars.

Missouri Pacific has ordered 625 box cars from Mount Vernon Car Co. and 625 box and 35 caboose cars from American Car & Foundry Co.

Bethlehem Steel Co. has purchased three locomotives from Baldwin Locomotive Works.

Chicago, Burlington & Quincy has awarded 12 Pacific type and eight mountain type locomotives to Baldwin Locomotive Works.

Belt Line Railway, Chicago, has purchased five locomotives from Baldwin Locomotive Works.

American Bridge Co. has bought one locomotive from Baldwin Locomotive Works.

Atchison, Topeka & Santa Fe has placed one locomotive with Baldwin Locomotive Works.

Foremen Organize Club at Racine, Wis.

Ninety foremen in plants at Racine, Wis., have organized a Foreman's Club to promote fellowship, cooperation and the exchange of ideas, largely through organization efforts of J. W. Morley, industrial secretary of the Racine Young Men's Christian Association, who was elected executive secretary of the organization. Other officers include Joseph D. Duffield, Belle City Malleable Iron Co., president; W. J. Walters, Massey-Harris Co., vice-president; and Harold Bullmore, Du-more Electric Co., secretary-treasurer. Among other industries represented are Harvey Spring & Forging Co., Lakeside Malleable Iron Co., J. I. Case Threshing Machine Co. and the Webster Electric Co.

Reinforcing Steel

Awards Total 1600 Tons—New Work Requires 2500 Tons

REINFORCING steel awards the past week totaled 1600 tons, of which 500 tons is for a warehouse at Newark, N. J. About 2500 tons was added to pending business, the largest inquiry being for 1000 tons for a municipal waterworks at Albany, N. Y. Awards follow:

BROOKLYN, 175 tons, New York Times plant, to Truscon Steel Co.

NEWARK, N. J., 500 tons, warehouse for Lehigh Warehouse & Transportation Co., to Faltoute Steel Co.

JERSEY CITY, N. J., 360 tons, bridge across Hackensack River, to Kalman Steel Co.

DEAL, N. J., 150 tons, sewage disposal plant, to Kalman Steel Co.

WAUKEGAN, ILL., 250 tons, addition to power plant of Public Service Co. of Northern Illinois, to American System of Reinforcing.

CLEVELAND, 250 tons, Severance Hall, to Bourne-Fuller Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

ALBANY, N. Y., 1000 tons, municipal waterworks.

BROOKLYN, 125 tons, subway route 109, section 3.

PHILADELPHIA, 1500 tons, two slaughter houses to be erected by Pennsylvania Railroad for Vogt Packing Co. and West Philadelphia Packing Co.

CINCINNATI, 265 tons, public school.

CHICAGO, 135 tons, bridge at Ninety-Fifth Street; Materials Service Corporation, general contractor.

CHICAGO, 380 tons, bridge; Underground Construction Co., general contractor.

OTTAWA, ILL., 250 tons, hotel.

Tone of Scrap Market in Detroit Stronger

DETROIT, Dec. 10.—The closing of Lake navigation has depressed prices on heavy melting and shoveling steel and hydraulic compressed scrap 50c. to \$1 a ton. Borings and short turnings have advanced the same amount and long turnings are up 50c. a ton. Some releases on current orders during the past week have emphasized the small tonnage that is being produced, and the general tone of the market is stronger despite present quoted prices. Indications are that there will be some considerable buying done by mills and furnaces before the first of the year.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$11.50 to \$12.00
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast....	12.50 to 13.00
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets....	11.00 to 11.50
Stove plate	9.00 to 9.50
New No. 1 busheling....	10.50 to 11.00
Old No. 1 busheling.....	9.00 to 9.50
Sheet clippings	8.00 to 8.50
Flashings	9.50 to 10.00

Railroad Equipment

Missouri Pacific Places Order For 1285 Freight Cars

THE Chesapeake & Ohio, Hocking Valley and Pere Marquette are reported to be on the verge of putting out an inquiry for about 13,000 freight cars to cover their 1930 requirements. It is believed that these carriers, all of which are controlled by the Van Sweringen interests, will be in the market within the next week or two. The Missouri Pacific has ordered 1285 freight cars and the Shell Petroleum Corporation 100 tank cars. The Reading is asking for bids on 100 multiple-unit electric coaches. The St. Louis Southwestern is inquiring for 25 locomotives, the Chicago Great Western for 10 and the Bessemer & Lake Erie for nine. The Burlington has purchased 20 locomotives. Details of the week's business follow:

Canadian National is inquiring for 20 60-ft. baggage cars.

Reading is taking bids on 100 multiple-unit electric coaches.

Beauharnois Light, Heat & Power Co., Montreal, has ordered 60 air dump cars from National Steel Car Corporation.

St. Louis Southwestern is now inquiring for 25 locomotives instead of 10, as reported last week.

Chicago Great Western is in the market for 10 locomotives.

Bessemer & Lake Erie will purchase nine locomotives.

Shell Petroleum Corporation has purchased 100 tank cars from General American Tank Car Corporation.

Rock Island is in the market for 10 coaches.

Chesapeake & Ohio, Pere Marquette and Hocking Valley railroads are lining

Lake Ore Water Shipments Break Record

Season's Total 65,204,600 Tons Against 64,734,198 in 1916—
Aggregate of Rail and Boat Movement Down

SHIPMENTS of Lake Superior ore by water during 1929 ended with the movement of one December cargo of 9112 tons from Marquette. Total shipments by water during 1929 amounted to 65,204,600 tons, breaking

that the total water and all-rail movement this year will be about 700,000 tons less than in 1916, when the total movement was 66,902,778 tons.

After several record-breaking months, November shipments took a

LAKE ORE SHIPMENTS BY WATER, GROSS TONS			
	November	Season 1929	Season 1928
Escanaba	574,520	6,348,573	5,487,556
Marquette	348,887	4,448,388	3,410,902
Ashland	422,081	7,620,960	6,481,158
Superior	1,146,655	19,623,139	15,413,694
Duluth	1,096,560	20,562,705	17,454,063
Two Harbors	352,821	6,601,735	5,733,501
Total	3,941,524	65,204,600	53,980,874
1929 increase			11,223,726

WATER SHIPMENTS OF LAST TEN YEARS, GROSS TONS			
1920.....	58,527,226	1925.....	54,081,298
1921.....	22,300,726	1926.....	58,537,855
1922.....	42,613,229	1927.....	51,107,136
1923.....	59,036,705	1928.....	53,980,874
1924.....	42,623,572	1929.....	65,204,600

the former record of 64,734,198 tons in 1916 by nearly 500,000 tons. The increase was 11,223,726 tons, or 20.7 per cent, over last year.

All-rail shipments this year will be approximately 1,000,000 tons, or only about half as much as during 1916, so

drop, amounting to 3,941,524 tons, a decrease of 319,419 tons from November last year.

Shipments by boat for November, for the entire year and for 1928 and total water shipments for 10 years are listed herewith.

All the facilities and metallurgical staffs of both the Ludlum and Sharon companies will be utilized in bringing out the products.

Newton Steel Co. Expects Better Automobile Buying

The Newton Steel Co. has declared the usual quarterly dividends of 75c. a share on common stock and \$1.50 on preferred for the fourth quarter. Officials report that steel stocks in possession of automobile companies are at low ebb, and they anticipate substantial improvement in requirements of automobile steels in the first quarter of 1930.

Jobbers to Distribute Falk Flexible Couplings

A new method of distributing Falk flexible couplings has recently been adopted by its manufacturer, the Falk Corporation of Milwaukee. In the future, this product will be handled by leading distributors of mill machinery and electrical supplies located at strategic points throughout the country. In the past, distribution has been limited to company branch houses and special agents in some of the larger cities.

A complete service plan has been formulated which will enable distributors in all centers to carry complete stocks of couplings, quickly available to the trade. It is the plan of the Falk Corporation to select distributors to carry out this plan. After the distributors are appointed, the company will aid them through the cooperation of factory salesmen and by sales helps of various kinds.

Stanley Electric Tool Co. a Merger of Several Lines

The Stanley Works, New Britain, Conn., announces the formation of the Stanley Electric Tool Co. This new company will manufacture and distribute the electrically-operated hand tools developed by the Stanley Rule & Level Co., including electric drills, screw drivers, bench and aerial grinders, etc.

The recent purchase of The Unishear Co., New York, adds to this list of products a complete line of motor-powered shears for outside and inside cutting of sheet metal. Another company recently acquired is the Ajax Electric Hammer Corporation, New York, which has for some time manufactured and sold Ajax electric hammers and bits.

A contract has been placed by the Jones & Laughlin Steel Corporation with Arthur G. McKee & Co., Cleveland, for a patented revolving distributor of the latest roller bearing type for No. 3 blast furnace at the Aliquippa plant. The same supplier is to furnish also eight 6-ft. Kling goggle valves for the same plant.

Interlake Iron Corporation Formed by Merger

Stockholders of the By-Products Coke Corporation, Chicago, at a special meeting in New York, Dec. 9, ratified the purchase of the properties and assets of the Zenith Furnace Co., Duluth, Minn., and the Toledo Furnace Co., Toledo, Ohio, and of the stock of the Perry Furnace Co., which owns a blast furnace and coke oven plant at Erie, Pa., together with valuable interests in ore mines in the Lake Superior district and coal properties in Green County, Pa.

The name of the company has been changed to the Interlake Iron Corporation, to which the new properties will be transferred Jan. 1. The company will have an annual capacity of over a million tons of pig iron and a half million tons of coke for the domestic market. The ore properties just acquired will satisfy the total requirements of the company's furnaces and will yield satisfactory grades of ore of all kinds produced on the six iron ore ranges of Lake Superior.

Pickands, Mather & Co., Cleveland, as well as the individual members of the firm who own stock in all of the companies in the merger, will take stock in the Interlake Iron Corporation in exchange for their several holdings and will remain prominent in the management of the new company. H. G. Dalton, Pickands, Mather & Co., will be chairman of the board of the Interlake company; C. D. Caldwell, president, By-Products Coke Corporation, will be president; and W. B. Castle, formerly president of the

Zenith Furnace Co., and Elton Hoyt, II, Pickands, Mather & Co., vice-presidents. Samuel Mather, Mr. Dalton and Mr. Hoyt will be directors.

No new financing has been necessary in the new arrangement. The balance sheet of the corporation will show current assets in excess of five times the current liabilities. The property and investment account will be in excess of \$50,000,000. First mortgage bonds of the By-Products Coke Corporation, approximating \$6,600,000, and of the Zenith Furnace Co., approximating \$3,000,000, will be assumed by the new corporation, and with bonds totaling \$75,000 of the Perry Furnace Co. will be the only funded debt outstanding, all other securities being represented by 2,000,000 shares of no par common stock.

Sharon Steel Hoop to Make Nirosta Products

The Sharon Steel Hoop Co., Sharon, Pa., has concluded negotiations with the Krupp Nirosta Co., Inc., holder of the Krupp patents of Dr. Strauss, under which it will immediately proceed with the production and distribution of high-alloy rust-resisting iron of the KA2 type and other brands. The Sharon company has also made arrangements with the Ludlum Steel Co., Watervliet, N. Y., by which the latter will for the present furnish the alloy ingots or semi-finished steel to the Steel Hoop company, principally from its Dunkirk, N. Y., plant. This will enable the Sharon company to begin distribution of this steel at an early date, probably during January, 1930.

PERSONAL

L. C. REIS, vice-president and general superintendent, Minnesota Steel Co., Duluth, Minn., has been made president to succeed the late S. B. SHELDON.

C. H. HERTY, JR., supervising metallurgist, United States Bureau of Mines Experimental Station, Pittsburgh, addressed the Canton-Massillon chapter of the American Society for Steel Treating, Dec. 9. His topic was the deoxidation of steel.

IRVING LANGMUIR, president of the American Chemical Society and associate director of the research laboratory of the General Electric Co., will receive the Chandler medal for "distinction in chemistry" on Dec. 13, when he delivers the Chandler lecture at Columbia University, New York, on "Electrochemical Interactions of Tungsten, Thorium, Caesium and Oxygen."

CHARLES M. NUCKOLLS, formerly with the International Harvester Co., Chicago, has been placed in charge of design and development work in the crane department of H. D. Conkey & Co., Mendota, Ill.

PHILIP BROWN, who has been with the Wilkoff Co., Youngstown, iron and steel dealer, for the past 15 years, has been elected vice-president of the company and general manager of the mill and warehouse division.

ARTHUR W. F. GREEN has accepted a position as manager of the tool steel division of the Edgecomb Steel Co., Philadelphia. He will handle particularly the products of the Vanadium Alloy Steel Co., which is one of the companies for which the Edgecomb company is a distributing agent. Mr. Green resigned as sales metallurgist of the Poldi Steel Corporation of America on Nov. 30 to take up his new position. He is secretary-treasurer of the Philadelphia chapter of the American Society for Steel Treating, of which he has twice been chairman.

ELTON HOYT, II, Pickands, Mather & Co., Cleveland, has been elected a director of the Newton Steel Co., Youngstown, succeeding G. T. Fillius.

PHILIP D. BLOCK, president, Inland Steel Co., has been made a member of the transportation committee of the Chicago Association of Commerce.

JORDAN KORP, metallurgical engineer with the Leeds & Northrup Co., Philadelphia, will address the St. Louis chapter of the American Society for Steel Treating at a meeting to be held in the American Annex Ho-

tel, St. Louis, Dec. 20, on "Correct Procedure in Heat Treating."

WILLIS S. GEORGE has been elected chairman of the board of the Pettibone-Mulliken Co., Chicago. R. E. WILSEY and BEN LYONS were added to the board, which has been increased from seven to nine members. Mr. George will take an active part in the management of the company.

FRANK M. HESSE, who has been with the Weirton Steel Co., Weirton, W. Va., since 1912, has been appointed



F. M. HESSE

secretary and treasurer of the National Steel Corporation, which is the company formed by the merger of the Weirton Steel Co., Great Lakes Steel Corporation and the blast furnace subsidiaries of the M. A. Hanna Co. Mr. Hesse was born in New Cumberland, W. Va., and was educated in the public schools of Pittsburgh and at Bethany College.

WILLIAM J. CRONIN, secretary of the Tri-City Manufacturers' Association, and A. R. PIERCE, director of industrial education of the National Metal Trades' Association, Chicago, were the speakers at the first meeting of the year of the Industrial Relations Group of the Tri-City Manufacturers' Association, held Dec. 2 at the Le-Claire Hotel, Moline, Ill.

R. C. TODD, assistant sales manager of the American Rolling Mill Co., Middleton, Ohio, delivered an illustrated lecture on new steel processes, Dec. 10, at a dinner meeting of the Milwaukee Association of Purchasing Agents.

W. H. POTTER has been made general sales manager of the Manganese Steel Forge Co., Philadelphia. Formerly, he was manager of the company's Chicago office.

R. B. TUHEY has been appointed district representative at Indianapolis, Ind., by the Lincoln Electric Co., Cleveland, and S. H. TAYLOR has been promoted to a similar position at Los Angeles.

WILLIAM K. FARRELL has become general purchasing agent of the American Locomotive Co., New York.

GORDON GORDON, who has been secretary of the Taft-Peirce Mfg Co., Woonsocket, R. I., for the past 25 years, has been elected president and treasurer, succeeding the late Louis V. Hubbard. FREDERICK S. BLACKALL, JR., who continues as vice-president and general manager, has been made secretary also.

FRANCIS R. WADLEIGH, consulting mining and fuels engineer, New York, and ERNEST L. BAILEY, mining engineer, have become associated as Wadleigh & Bailey, 1 Broadway, New York, to engage in consulting work.

W. H. VAN VLECK has resigned as New York district sales manager of the Alan Wood Steel Co.

Duriron Co. Enlarges Plant Manufacturing Facilities

The Duriron Co., Inc., New York and Dayton, Ohio, has under way a plant expansion program calling for an enlargement of its facilities at Dayton and for a foundry at Newark, N. J. The company's foundries have put into operation new electric furnaces of both high-frequency and arc types capable of handling castings up to 10,000 lb. Castings will be manufactured not only in Duriron, Durimet, KA-2 and other alloy steels, but also in monel metal or nickel as corrosion-resistant needs dictate.

The Dayton machine shop has been enlarged to enable the finishing department to keep pace with the increased foundry capacity. The company's line of pumps, valves, pipe, fittings and other standard products will be available in the near future in Durimet or KA-2 alloy steel as well as in Duriron. A new fireproof laboratory is nearing completion at Dayton.

In both sales engineering and manufacturing the company has become affiliated with Industrial Welded Alloys, Inc., both organizations being divisions of Industrial Alloy Products Corporation. This makes it possible for the one unit to furnish practically all requirements for heat and corrosion-resistant materials, including fabricated sheet and plate construction, welded pipe, tanks, towers and special equipment.

What is said to be the largest single order for valves of such large size is one for nineteen 6-ft. Kling goggle valves for the Johnstown plant of the Bethlehem Steel Co. This order was placed with Arthur G. McKee & Co., Cleveland.

OBITUARY

CHARLES E. HILL, assistant general sales agent for the Crucible Steel Co. of America, with headquarters in Pittsburgh, died suddenly at his home in that city on Dec. 1. He was born in North Side, Pittsburgh, in 1883, and after attending school there, he entered the employ of the Crucible company in a secretarial capacity in 1901. He had been with the company continuously since that time, principally in the sales department; in the position he held at the time of his death he was active in the greater part of the middle section of the country.

JOHN F. GOLDING, inventor of expanded metal and of machinery for producing it, died at his home in Philadelphia, Nov. 29. He was born in Pittsburgh on May 2, 1848, and was educated in Iowa State University. He had a varied career, having been a farmer, lawyer and editor of the *Industrial World and Iron Worker*, Chicago, before becoming known as an inventor. In 1898 he was awarded the John Scott medal for his invention of expanded metal and machinery for its production. He adapted expanded metal to the reinforcement of concrete. At the time of his death he was vice-president of the United States Nut & Washer Co.

WALTER FRANK, service manager of the bar department of the Interstate Iron & Steel Co., died Dec. 5, aged 35 years. His first employment by a steel company was in the Chicago office of the Republic Iron & Steel Co., from which he was transferred to a position at the Moline, Ill., mills. Several years later he returned to Chicago to accept a position with the Interstate company, where he advanced by successive steps to the position which he held at the time of his death.

HENRY ADAMS, for some years head of the mechanical engineering department of the office of the Supervising Architect of the Treasury Department, Washington, and for the past 30 years consulting engineer with offices in Baltimore, died suddenly Dec. 9 at his home in Baltimore. He was born in 1858 at Duisburg, Germany. He was one of the early presidents of the American Society of Heating and Ventilating Engineers.

MAURICE A. OUDIN, vice-president of the International General Electric Co., died at his home in Schenectady Dec. 4, following an illness with pneumonia, aged 63 years. He was graduated from the College of the City of New York in 1885 and was graduated from Princeton University in 1891. He joined the Thomson-Houston Electric Co., Lynn, Mass., and continued in various capacities with its suc-

cessor, the General Electric Co., at Schenectady. He was made manager of the foreign department in 1904, and traveled extensively in Russia, China, and Japan. When the International General Electric Co. was



CHARLES E. HILL



J. F. GOLDING

formed in 1919 Mr. Oudin was appointed its first vice-president. He served on the Advisory Committee of the Far East, a group of business men with which the Department of Commerce conferred on major problems relating to the Far East while President Hoover was Secretary of Commerce.

FREDERICK A. COE, formerly with Morris, Wheeler & Co., Philadelphia, died at his home in Philadelphia, Dec. 5, aged 92 years. He was born in England and entered the employ of Morris, Wheeler & Co. in 1888, with whom he remained until his retirement 20 years ago.

SAMUEL T. WEYMAN, one of the founders of the Atlantic Steel Co.,

Atlanta, Ga., and for many years a vice-president of the Connors-Weyman Steel Co., Birmingham, was killed in a fall on his estate, in fighting a forest fire Nov. 28. He was 67 years old.

FORRESTER B. LESLIE, sales manager of A. C. Leslie & Co., Ltd., iron and steel, Montreal, died on Nov. 21, aged 51 years. He was a son of Alexander C. Leslie, founder of the company, and entered the business when about 21 years of age.

JOHN C. TAGGART, assistant general superintendent at the New Castle, Pa., works, Carnegie Steel Co., died on Dec. 4 at a hospital in that city. He was 66 years of age.

DAVID C. KLAUSMEYER, assistant to the president, Cincinnati Bickford Tool Co., died suddenly in Cincinnati, Dec. 6. He was born in New York, Oct. 31, 1882. He was graduated from the Ohio Mechanics Institute and started work in the shops of the Bickford Drill & Tool Co., one of the constituent companies merged into the Cincinnati Bickford Tool Co. Eventually, Mr. Klausmeyer was put in charge of all designing and later of production.

Canadian Iron and Steel Made in 1928

Output valued at \$609,632,999 is reported by the Dominion Bureau of Statistics, Ottawa, for iron and steel plants in Canada and plants working up iron and steel into finished form. There were 1159 establishments, with capital figured at \$702,931,186, covered in the survey. These plants employed 119,200 people and paid salaries and wages aggregating \$168,320,039. Deducting cost of materials from selling value of products, the estimated value added by manufacture was \$300,014,925.

Imports into Canada of iron and steel and other products in 1928 were valued at \$322,979,144, of which more than 91 per cent, or \$295,114,281, were from the United States. The total shows a gain of about \$75,000,000 over 1927. Exports in 1928 were \$70,665,677, or a gain of about 4 per cent on 1927. The United States received more than any other country, with \$9,216,896. United Kingdom, Australia, Argentina, India, New Zealand, Brazil and British South Africa followed, in that order, all with amounts of more than \$2,950,000.

Among the principal producing industries automobiles stood first, with \$162,067,495 of products. Castings and forgings showed \$81,904,852. Railroad rolling stock was third, with \$73,422,057; primary iron and steel, \$62,071,694; machinery, \$51,046,139; sheet metal products, \$49,846,671; agricultural implements, \$41,199,341; hardware and tools, \$25,131,821, and other products in smaller amounts.

Steel Cartels Disorganize Market

Uncertainty Rules Both Buyers and Sellers—Dutch Make More Pig Iron—
Zinc Sheet Cartel Proposed—Holidays Slow British Trade

(By Cable)

LONDON, ENGLAND, Dec. 9.

WITH the holidays approaching and annual inventories being made, the iron and steel markets are quiet. Cleveland pig iron makers are well sold to the end of the year, and stocks are low, so that price concessions have been refused. Export business is unobtainable at present high prices.

Hematite furnaces have sold iron at £4 (\$19.52) a ton for prompt shipment and £4 1s. (\$19.76) a ton for forward delivery of mixed numbers, but are still making deliveries on a number of uncompleted large contracts at low prices.

General export sales of heavy steel are slow, but mill order books are fairly well filled with domestic contracts.

Tin plate is firm with demand active and mills well sold ahead. World consumption is reported increasing and the outlook is considered favorable. Severe floods in Wales have affected some mills and materially reduced output.

The British Can Co., with a capital of £750,000 (\$3,660,000) has been formed to enter into food packing and allied activities in the United Kingdom, in conjunction with the American Can Co., which will supply can making equipment, and the Thermokept Corporation, which holds licenses for food packing patents. The nucleus of the new corporation was provided by the purchase of the

can business of Ernest Taylor, Ltd., Liverpool.

Galvanized sheets are quiet and prices are easy, with works unable to obtain specifications. Black sheets are quiet after the recent moderate activity in Japan on light gages. Germany is selling No. 30 gage sheets to Japan for £12 3s. (\$59.29) a ton, or 2.69c. a lb., f.o.b.

British steel makers are arranging a London sales office under the management of Julian Piggott, which will be known as the British Steel Makers Export Association.

The Continental market is somewhat disorganized by the International Steel Cartel meetings. Reported decisions of the cartel are uncertain, but are believed to mean confirmation of the 10 per cent reduction of output originally suggested in November, but so far adopted only by Belgium.

It is understood that this reduction has been applied to all members from

the beginning of December and that a minimum price on merchant bars of £5 5s. per ton (1.14c. per lb.) has been confirmed. At a future meeting in Charleroi, Belgium, two representatives each from Germany, France, Luxemburg and Belgium will arrange a list of international extras and fix minimum prices on other products. A preliminary price of £5 per ton (1.09c. per lb.), f.o.b., is reported to have been established on beams. The International Steel Cartel is meeting Dec. 14 at Dusseldorf, and renewal of the agreement is confidently expected.

The European Wire Rod Cartel has been renewed for another 12 months, provided the German syndicate is also prolonged. The International Rail Makers Association is meeting in Dusseldorf, Dec. 13, and the Continental Tube Cartel, Dec. 10.

Meanwhile, the general market is uncertain, with both buyers and sellers reluctant to transact business.

British Pig Iron Less Active

Consumers Reluctant to Pay Present Prices—Coke Supply Improves—Tin Plate Mills Well Booked

LONDON, ENGLAND, Nov. 25.—The tone of the iron and steel markets has improved slightly, but the volume of new business is small. The usual seasonal activity in pig iron has been

less pronounced, consumers being reluctant to follow the upward trend of prices. For some time the fuel situation has been acute and prices have been advancing, but during the

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.88

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12½s. to £3 13½s.	\$17.69 to \$17.93
East Coast hematite...	4 0 to 4 1	19.52 to 19.76
Ferromanganese, export	12 5 to 13 0	59.42 to 63.05
Billets, open-hearth...	6 2½ to 6 5	29.89 to 30.50
Sheet bars, open-hearth	6 0 to 6 5	29.28 to 30.50
Black sheets, Japanese specifications	12 10	61.00
Tin plate, per base box	0 18¾ to 0 19	4.57 to 4.64
Rails, 60 lb. and heavier	7 15 to 8 15	37.59 to 42.43
Cents per Lb.		
Steel bars, open-hearth...	7 15 to 8 10	1.69 to 1.85
Beams, open-hearth...	7 2½ to 7 12½	1.55 to 1.66
Channels, open-hearth...	7 7½ to 7 17½	1.60 to 1.72
Angles, open-hearth...	8 2½ to 8 12½	1.77 to 1.87
Ship plates, open-hearth	7 12½ to 8 2½	1.66 to 1.77
Black sheets, No. 24 gage	10 0 to 10 5	2.18 to 2.23
Galvanized sheets, No. 24 gage	12 10 to 12 15	2.72 to 2.78

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 7s. to £3 11½s.	\$16.35 to \$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 6 to 3 8	16.11 to 16.59
Billets, Thomas	4 12 to 4 14	22.45 to 22.94

Sheet bars, Thomas...	4 10 to 4 11½	22.08 to 22.45
Wire rods, low C., No. 5 B.W.G.	6 3 to 6 5	30.01 to 30.50
Rails, 60 lb. and heavier	6 8½ to 6 10*	31.35 to 31.72
Rails, light	6 1½	29.65
Cents per Lb.		
Steel bars, merchant...	5 5	1.14
Steel bars, deformed...	5 4	1.13
Beams, Thomas, British standard	4 19 to 5 3	1.08 to 1.12
Channels, Thomas, American sections...	5 10 to 5 17	1.19 to 1.27
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5 0 to 5 6	1.09 to 1.15
Angles, Thomas, 3-in.	5 6	1.15
Ship plates open-hearth inspected	7 5	1.58
Black sheets, No. 31 gage, Japanese	12 3 to 12 4	2.47 to 2.66
Hoop and strip steel over 6-in. base	5 11½ to 5 12½	1.21 to 1.22
Wire, plain, No. 8 gage	7 2½ to 7 3½	1.55 to 1.56
Wire, galvanized, No. 8 gage	8 12½ to 8 15	1.87 to 1.90
Wire, barbed, 4-pt. No. 12 B.W.G.	11 5 to 11 6	2.45 to 2.46
Wire nails, base	0 6¼	\$1.55 per keg
Wire nails, assortments 1 to 6-in. keg	10 6¼	2.69

*Open-hearth steel, 8s. (\$1.94) per ton extra.

past fortnight Cleveland producers have blown out two furnaces for repairs and, as a result, pressure for fuel has relaxed and prices have eased slightly. Makers point out, however, that selling prices of pig iron have been less than cost of production for some time and have made no revision in their quotations.

Furnaces are, as a rule, fairly well engaged for the next few weeks and some sizable contracts have been made for deliveries of iron in the first quarter. Current output of Cleveland iron is being fully absorbed and stocks on yards are negligible. Hematite producers are fairly well occupied at present and some substantial sales to domestic and export buyers have enabled them to advance prices to a more profitable level. For first quarter delivery, hematite iron is being quoted at \$4 1s. (\$19.76) per ton for East Coast, mixed numbers, an advance of about 4s. (98c.) per ton within a few weeks.

Recently, Continental ship owners placed an order for seven large oil tank ships, which are to be entirely built of British steel. Conditions in the finished steel market have not been active, although domestic mills are supplying the bulk of the heavy steel requirements and there is considerable activity in general engineering and construction.

The announcement of the International Steel Cartel that output was to be reduced by 10 per cent was expected by British mills to diminish the recent severe competition in foreign markets. Although Continental prices did develop some firmness immediately after the announcement, this improvement has not been maintained and European mills are still offering severe competition for export orders.

World demand for tin plate is reported good and is expanding steadily. Unfilled orders on makers' books early this month were the largest in a number of years and included a contract for oil can tin plate. Many mills are booked with business well into next year. Restriction of output has worked satisfactorily and even at today's prices it pays some mills better to receive 2s. (49c.) per base box for underproduction. Makers claim that the present base price of 18s. 9d. (\$4.58) per base box, f.o.b. port, is not especially profitable and that any substantial advance in the tin market will undoubtedly be promptly reflected in the tin plate quotation.

German Shipyards Building American Ships

HAMBURG, GERMANY, Nov. 27.—German shipyards have recently booked some sizable shipbuilding contracts from the United States. The Bremer Vulcan shipyard has been awarded a 16,000-ton merchant ship driven by MAN Diesel engines. The Germania Werft, Kiel, controlled by the Krupp interests, has booked a 17,000-ton tank ship, equipped with Krupp Diesel engines, and the Vere-

inigte Nordsee Werften, a 15,000-ton tank ship with Sulzer Diesel engines from the Standard Oil Shipping Co., New York.

Other shipbuilding contracts from the United States have included a 2500-ton private yacht to be built by the Germania Werft, Kiel, which brings the total of private yachts built by this yard for American owners, since 1925, to seven. The Germania Werft is also building two merchant ships of 8000 tons each for American companies.

German Aluminum-Coated Sheet Mill Completed

HAMBURG, GERMANY, Nov. 27.—The Stahlwerk Hoesch announces that its new mill at Stockheide for the production of aluminum-coated steel sheets has been completed and trial operation of the new equipment gave satisfactory results. Regular commercial production of aluminum-coated sheets will begin in December or early in January.

European Zinc Sheet Cartel Proposed

HAMBURG, GERMANY, Nov. 27.—The recent dissolution of the Continental Zinc Cartel has occasioned no surprise, as the cartel had for some time been unable to control its membership. Although it regularly fixed a production quota based on the output of zinc in November, 1928, members were not influenced by the cartel decisions, although they voted for them, and for some time production of zinc in Germany, Belgium and Poland had increased whenever the cartel announced restriction of output.

It is expected that the European zinc sheet producers will form a cartel. Meanwhile, the German Zinc Sheet Cartel has taken over export sales of about 75 per cent of the zinc sheet production of Germany and all the production of Austria, Poland, Hungary and Czechoslovakia. This gives it about 105,000 tons of zinc sheets annually to sell for export. Belgian producers, which exported about 56,000 tons last year, are reported negotiating with the German cartel.

Dutch Pig Iron Output Increased Last Year

HAMBURG, GERMANY, Nov. 27.—Pig iron production of the Royal Netherlands Blast Furnace & Steel Works, Ymuiden, Holland, in the fiscal year, July 1, 1928, to June 30, 1929, was 256,479 tons, compared with 209,875 tons in fiscal year 1927 to 1928. A total of 215,714 tons was shipped for export in 1928-1929, compared with 149,633 tons in the previous year, the greater part of the tonnage going to Great Britain and the United States. Completion of a third blast furnace early next year will bring the total capacity of the company to 400,000 tons a year.

Nirosta Licenses Granted 24 German Makers

HAMBURG, GERMANY, Nov. 27.—Although the Friedrich Krupp A. G. is the sole German holder of patents on high-chromium nickel steel, the company is not seeking to monopolize the production of this alloy, and to date has licensed 24 makers in Germany to operate under the patents for Nirosta. The charge for licenses is not high, but the number of licensed makers makes a substantial total income from this source. A policy of licensing other makers was adopted by the Friedrich Krupp A. G. as the best means of avoiding possible severe competition from companies that otherwise might have developed a competitive product to which the patents might not have applied.

European Wire and Nail Prices Shaded

HAMBURG, GERMANY, Nov. 27.—The German Wire Makers' Cartel has fixed its prices at £7 12s. 6d. per ton (\$1.66 per 100 lb. keg) for wire nails, £7 7s. 6d. per ton (1.61c. per lb.) for bright wire, £12 7s. 6d. per ton (2.69c. per lb.) for barbed wire, and £9 per ton (1.96c. per lb.) for galvanized wire. Belgian wire mills are shading these prices by as much as 10s. (\$2.44) per ton, which has resulted in similar large concessions being offered by the German makers.

Restriction of Cartel Output Disregarded

HAMBURG, GERMANY, Nov. 27.—Although the International Steel Cartel has officially reduced the steel production quota by 10 per cent, restriction of output began to be disregarded as soon as prices registered a slight upward turn. Consequently most mills are maintaining their former rate of operation and may pay a slight penalty for excess output. As the disregard of the restriction announced by the cartel is believed to be general with all members, and in the case of general overproduction the penalty payments are refunded in proportion to the excess of output, most makers will probably lose little.

German mills, which have been urging a selling syndicate for products of members of the International Steel Cartel, are pointing to the present inability of the cartel to control prices or production as further proof of the necessity for such a sales organization, which will be discussed at a meeting of a special committee of the cartel at Liège, Belgium, Dec. 3.

The Hevi-Duty Electric Co. has moved into larger quarters at 4100 Highland Boulevard, Milwaukee. The new building will provide double the present productive capacity and is especially equipped for building furnaces and furnace equipment.

Machinery Markets and News of the Works

Tool Sales Holding Up Well

Despite Proximity of Holidays and Inventory,
Sales Have Gained

IN view of the slackening pace of business throughout the country, machine tool sales have been holding up unusually well. Despite the proximity of the holiday season and the annual inventory period, the volume of orders has actually shown a gain over the preceding two weeks.

While bookings are considerably less than they were a few months ago, in most centers they are paralleling those of November and are ahead of the record reported for the corresponding month of last year.

The amount of pending business, as well as numerous inquiries which are expected to be put out soon, gives promise of an active market for machine tools in the early weeks of 1930.

There has been no appreciable diminution in tool builders' shop schedules, which are being maintained practically at full capacity.

The Amtorg Trading Corporation, New York, has placed an order with a Cincinnati builder for 10 standard lathes. A New York district user has purchased three large lathes.

Foremost among lists which will appear shortly is one for \$250,000 worth of machine tools for the Illinois Steel Co. The Allis-Chalmers Mfg. Co., Milwaukee, also may buy a large amount of equipment for its tractor plant additions at Milwaukee and Springfield, Ill.

Some automobile parts manufacturers are busier, having received large orders from the Ford company, and are buying a few tools. A machine tool user is asking for prices on seven turret lathes which he will buy in the immediate future. The Electric Auto-Lite Co., Toledo, is contracting for tools to equip its new plant extensions.

and other metal containers, steel pails, etc., to cost more than \$70,000.

Westchester Lighting Co., 9 South First Avenue, Mount Vernon, N. Y., is arranging expansion and improvement program, including addition generating and transmission facilities, to cost \$8,000,000.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost \$185,000 with equipment.

Grover Loening, formerly consulting engineer and director of Keystone Aircraft Corporation, Bristol, Pa., has organized Grover Loening Co., with capital of \$1,000,000, to operate plant for experimental airplane work and development, including production of single-motor aircraft. Space was recently secured at 305 East Forty-sixth Street, and operations will be placed under way at once.

Parkway Motor Co., Orawaupum Street, White Plains, N. Y., will soon begin superstructure for two-story service, repair and garage building, to cost about \$100,000 with equipment. P. B. Nichols, Depot Plaza, is architect.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, has plans for three-story ice-manufacturing plant, refrigerating and ice cream factory to cost about \$400,000 with machinery. Henry

J. Nurick, 44 Court Street, is architect and engineer.

Spoor-Lasher Co., Inc., Poughkeepsie, N. Y., general contractor, has acquired local plant of Phoenix Horseshoe Works for about \$250,000, and will remodel for equipment storage, distributing and repair plant for company service.

Sonora Products Corporation, 50 West Fifty-seventh Street, New York, manufacturer of talking machines and parts, has perfected new machine for reproducing talking motion pictures in home, and will develop plant capacity for new units.

Union Free School District No. 2, Tuckahoe, N. Y., is considering installation of manual training equipment in new two- and three-story high school to cost about \$550,000, for which bids are being received on general contract. Knappe & Morris, 171 Madison Avenue, New York, are architects.

G. G. Miller, 1482 Broadway, New York, architect, has filed plans for multi-story automobile service, repair and garage building, to cost about \$200,000 with equipment.

Idealite Lamp Shade Mfg Co., 836-38 Broadway, New York, manufacturer of metal frame lamp shades, metal novelties, etc., has leased four-story factory at 49-55 Fremont Street, Jersey City, N. J., for new plant. Three existing plants in New York and one factory at Higganum, Conn., will be removed to new location where production will be concentrated.

Department of Public Affairs, City Hall, Newark, Jerome T. Congleton, director, will receive bids until Dec. 19, for storage batteries, manhole frames and covers, couplings, drive chains and fan belts, etc.

Kent Garage Investing Corporation, 350 Madison Avenue, New York, will soon begin superstructure for multi-story service, repair and garage building, 180 x 190 ft., at Newark, to cost over \$1,000,000 with equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects.

William Prym of America, Inc., 16 West Nineteenth Street, New York, manufacturer of metal products, is considering new plant at High Bridge, N. J., to cost over \$100,000 with equipment.

Montauk Equipment Co., Hoboken, N. J., has leased space in building at 1021 Grand Street, totaling 7500 sq. ft. floor space, to manufacture electrical specialties.

Public Service Railway Co., Public Service Terminal, Newark, is contemplating two-story automobile service, repair and garage building, 100 x 370 ft., for motor buses, to cost about \$135,000 with equipment.

Beckwith-Chandler Co., Wright Street and Avenue B, Newark, manufacturer of colors, varnishes, lacquers, etc., has revised plans for three-story addition, to cost about \$100,000 with equipment. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are architects.

Lydon Brothers, Inc., recently organized, is manufacturing industrial ovens

New York

NEW YORK, Dec. 10.—While demand for machine tools is smaller than two months ago, it is holding up much better than is usual at this time of the year. November sales, though below those of October, were higher than the total for the same month last year. A favorable indication is that the volume of inquiries has increased within the past week or two. Considerable of this prospective buying probably will go over into January. An unusual sale of the past week was a \$20,000 grinding machine to a Boston company.

Brooklyn Borough Gas Co., 1721 Sheepshead Bay Road, Brooklyn, has plans for equipment storage and distributing plant, with mechanical shop, and automobile service, repair and garage building at 805-33 Neptune Avenue, to cost \$275,000 with equipment. Bloch & Hesse, 18 East Forty-first Street, New York, are architects; C. E. Smith, 116 West Thirty-ninth Street, New York, is engineer.

Fein Tin Can Co., Inc., 65 Greene Street, New York, has leased space in building of New York Dock Co., Furman Street, Brooklyn, for manufacture of tin

for japanning, enameling, core baking, tempering, annealing and glass decorating, at its plant, 229 Colden Street, Jersey City. T. Lydon, formerly district sales manager of Young Brothers, Detroit, heads the company.

Philadelphia

PHILADELPHIA, Dec. 9.—Standard Oil Co. of Pennsylvania, Inc., Sixth and Chestnut Streets, Philadelphia, will take bids at once for new refinery, storage and distributing plant on Schuylkill Avenue, to cost over \$175,000 with equipment.

Reading Co., Reading Terminal, Philadelphia, has plan for expansion to cost \$10,000,000, part of fund to be used for electrification program, now under way from Philadelphia to Lansdale, and for completion of car repair, storage and equipment shops at Wayne Junction, last-noted to cost about \$1,000,000 with equipment. Engineering department of railroad is in charge.

Ovens, power equipment, conveying and other machinery will be installed in six-story and basement addition, 60 x 120 ft., to be erected by Tasty Baking Co., 2301 Huntington Park Avenue, Philadelphia, to cost more than \$350,000 with equipment, for which contract has been let to Turner Construction Co., Seventeenth and Walnut Streets.

Bachmann Brothers, 609 Commerce Street, Philadelphia, manufacturers of celluloid and kindred products, have asked bids on general contract for two-story factory, to cost over \$70,000 with presses and other equipment. Eugene A. Stopper, Fuller Building, is architect.

A. Moe & Co., Inc., Philadelphia, has been organized by Lewis H. Christensen, 5651 North Mascher Street, and associates, to take over and expand A. Moe & Co., operating a general machine works at 122 Lombard Street. New organization will engage as iron and brass founder, in addition to machinist, and will also operate a welding works.

Farman Aircraft Corporation of France, affiliated with Ludington Aircraft, Inc., Island Road and Tinicum Avenue, Philadelphia, N. Ludington, president, has plans by Airport Development & Construction Co., Mitten Building, for three-story aircraft manufacturing plant near Camden, N. J., to cost over \$100,000 with equipment.

Armstrong Cork Co., Camden, N. J., with headquarters at Lancaster, Pa., has awarded general contract to Townsend, Schroeder & Wood, Inc., Philadelphia, for four-story and basement addition, to cost more than \$100,000 with equipment. Part of unit will be used for oven department.

Sun Oil Co., 1603 Walnut Street, Philadelphia, is said to be arranging for expansion at refinery and storage and distributing plants at Linwood, Pa., in connection with a pipe line project from Linwood and Marcus Hook plants to different points in Pennsylvania and extending to New York State line. Entire project will cost over \$2,500,000, with booster pumping plants and operating facilities. It is understood that a subsidiary company will be formed to carry out pipe line project.

Lansdowne Heating Co., Lansdowne, Pa., J. M. Delton, Drexel Hill Lumber & Supply Co., head, is considering early construction of steam power plant for central heating service, to cost more than \$80,000 with equipment. A site has been secured.

Byron-Jackson Co., Berkeley, Cal.,

The Crane Market

NEW inquiry for locomotive cranes has declined as the year end approaches, and with contractors completing their contracts many rented cranes are being returned to the owners. The Bethlehem Steel Co., Bethlehem, Pa., has closed on a 50-ton locomotive crane, for which it has been in the market for a month. The overhead crane market is also inactive and not much improvement is expected by some sellers until after the first of the year, except for the probable award of certain business, which has been under consideration for some time. The Boston & Maine Railroad is reported considering an inquiry for an overhead crane and the Boston & Albany Railroad has closed on a gantry crane.

In the Pittsburgh district, inquiries for overhead cranes have declined in the past few weeks and most of the installations under consideration are expected to be delayed until after the first of the year. The Carnegie Steel Co. is negotiating for a number of cranes for various plants.

Among recent purchases are:

Boston & Albany Railroad, Boston, 20-ton, 58-ft. span gantry crane with 5-ton auxiliary from Milwaukee Electric Crane & Mfg. Corporation.

Standard Oil Co. of New York, 3-ton, 64-ft. 9-in. span hand power crane for export from unnamed builder.

Illinois Steel Co., Gary, Ind., two 30-ton, 8-wheel, steam-driven locomotive cranes from Orton Crane & Shovel Co.

Steel Products Co., McKees Rocks, Pa., 3-ton, 47-ft. span, electric overhead crane from Northern Engineering Works.

Center Foundry & Machine Co., Wheeling, W. Va., 20-ton and 10-ton, 50-ft. span electric overhead cranes from Northern Engineering Works.

manufacturer of pumping machinery, oil well equipment, etc., has secured property near Saucon Park, Bethlehem, Pa., for establishment of branch plant, to cost over \$85,000 with equipment.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines, a subsidiary of Auburn Automobile Co., Auburn, Ind., is pushing work on an expansion program, including additions to foundry and assembling plants. A new machine shop is scheduled for completion early next year, to be given over to production of a new type of radial aircraft engine. Entire program will represent investment of more than \$250,000. W. H. Beal is vice-president, in charge.

Barbour Brothers Steel Co., Trenton, N. J., has been organized with capital of \$100,000 and 1500 shares of stock, no par value, to take over and expand iron and steel works of Barbour Brothers, Marion Street and Reading Railway. New company is headed by David and William B. Barbour, and William B. Barbour, II.

Buffalo

BUFFALO, Dec. 9.—Plans have been filed by Buffalo Sintering Corporation, 10 Marilla Street, Buffalo, for one-story plant, to cost about \$80,000 with equipment.

Coplan Steel Co., Hull, Que., is arranging for resumption of operations at plant

at Ogdensburg, N. Y., which suspended production about three years ago. Initial work will be given over to finishing operations only, locomotive grates and other rough castings being shipped from Hull plant for that purpose. A. H. Coplan is head.

National Paper Products Co., Carthage, N. Y., a division of Crown Zellerbach Corporation, San Francisco, has work under way on extensions and improvements in former local mill of West End Paper Co., recently acquired, including installation of additional equipment, to cost over \$100,000.

William and Samuel Bazarnic, 1076 College Avenue, Elmira, N. Y., have organized William Barzarnic, Inc., with capital of 1000 shares of stock, no par value, and plan operation of machine shop and mechanical works for production of iron and steel specialties.

New York & Ontario Power Co., care of George S. Van Kernen, Ogdensburg, N. Y., is considering construction of hydroelectric generating plant near Waddington, N. Y., to cost about \$450,000, including transmission system.

Savage Arms Co., Utica, N. Y., has purchased shotgun and rifle manufacturing division of A. H. Fox Gun Co., Eighteenth Street and Wagner Avenue, Philadelphia, and will consolidate. Certain equipment will be removed from Fox plant at Utica, where expansion will be carried out to manufacture Fox type of guns as regular line of Savage company. Fox company will continue to operate Philadelphia plant under names of Fox Mfg. Co., and Fox Automotive Products Co., specializing in manufacture of toy pistols and automobile equipment. C. A. Godschalk will continue as president of Fox organization, and J. H. Connelly, secretary and treasurer.

New England

BOSTON, Dec. 9.—Heil Co., 140 Brookline Street, Boston, manufacturer of steel dump bodies for motor trucks, truck hoists, etc., with main plant at Milwaukee, has awarded general contract to John MacDonald Construction Co., 100 Arlington Street, for one-story factory branch and distributing plant at Brighton, Mass., 42 x 190 ft., to cost about \$40,000 with equipment.

J. L. White Co., 16 Brown Street, Waterbury, Conn., has awarded general contract to James Corideo, Inc., 76 Eastern Avenue, for one-story welding plant, 60 x 130 ft., to cost about \$25,000.

Hemphill Co., Central Falls, Pawtucket, R. I., manufacturer of knitting machinery and parts, has work under way on additional story on two-story factory, 80 x 300 ft., for which general contract recently was let to Rowley Construction Co., 206 Central Avenue, to cost more than \$40,000.

American Bosch Magneto Corporation, Springfield, Mass., manufacturer of magnetos, radio equipment, etc., is considering one and two-story addition, for heat-treating and scrap reclamation departments, to cost about \$50,000 with equipment.

Greenfield Electric Light & Power Co., Greenfield, Mass., is erecting a three-story and basement equipment storage and distributing plant, 25 x 85 ft., with mechanical and electrical repair departments, to cost over \$50,000 with equipment.

Boston & Maine Railroad Co., Cambridge, Mass., is arranging a fund of more than \$100,000 for tools and equip-

ment for new engine house and shops now under way at Somerville, Mass.

Chapman Valve Mfg. Co., Indian Orchard, Mass., manufacturer of heavy gate valves, etc., is planning one-story addition to steel foundry, 75 x 150 ft., to cost over \$80,000 with equipment. An annealing oven department will be installed.

New Haven Road Construction Co., Inc., Hamden, Conn., has awarded contract for a one-story equipment and utility plant.

Andrew S. Aharonian, Providence, manufacturing jeweler, will soon start work on a two-story, plant, 65 x 82 ft. Grinding and polishing tools will be bought.

Great Northern Paper Co., East Milinocket, Me., has plans for a power house near Matawamkeag, Me.

Multibestos Co., Walpole, Mass., closed bids Dec. 9 on a drying oven unit to cost \$10,000 without equipment. Electrical heating and other equipment will be purchased.

J. L. White Welding Co., Waterbury, Conn., has started work on a one-story, 60 x 129 ft., welding shop, to cost \$20,000 without equipment.

Mays Mfg. Co., Inc., Providence, metal specialties, will start work at once on a one-story plant, 60 x 84 ft. Some machine tools will be purchased.

Maine Seaboard Paper Co., Augusta, Me., has started work on a \$6,000,000 newsprint plant at Bucksport, Me. Special grinding equipment will be purchased.

Detroit

DETROIT, Dec. 9.—Plans are being considered by Kuhlman Electric Co., Twenty-sixth and Jefferson Streets, Bay City, manufacturer of electric transformers and kindred equipment, for one-story addition, to cost about \$50,000 with machinery.

Hastings Mfg. Co., Hastings, Mich., manufacturer of piston rings and other automotive equipment, has approved immediate erection of one-story addition, 65 x 320 ft., to cost about \$70,000 with equipment. Part of unit will be used for inspection and distributing service.

Motor Wheel Corporation, South Saginaw Street, Lansing, Mich., manufacturer of steel wheels, etc., has plans for two-story addition, 80 x 475 ft., to cost about \$175,000 with equipment.

H. S. Lee Foundry Co., Plymouth, Mich., has acquired manufacturing rights for power spraying equipment of Pontiac Tractor Co., Pontiac, heretofore produced under trade name Universal, and will carry out production at Plymouth plant, continuing manufacture of gray iron and semi-steel castings.

City Council, Allegan, has plans for a municipal hydroelectric power plant, to cost more than \$400,000 with transmission system, and will begin work soon. Ayres, Lewis, Morris & May, Cornwall Building, Ann Arbor, are architects and engineers.

American Twist Drill & Tool Co., 2804 West Jefferson Street, Detroit, has plans for one-story addition, to cost more than \$75,000 with equipment. Clair W. Ditchy, 415 Brainard Street, is architect.

Detroit Aircraft Co., 115 Joseph Campau Avenue, Detroit, manufacturer of airplanes and parts, is considering one-story unit at Wayne, to cost about \$70,000 with equipment.

Board of Trustees, University of De-

troit, Livernois Avenue and Six-Mile Road, Detroit, will soon begin work on two-story engineering building, part of unit to be used as aerodynamical laboratory for aircraft experiments, to cost about \$100,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, are architects.

American Malleable Co., Owosso, Mich., manufacturer of malleable iron castings, will erect one-story addition, 75 x 85 ft., for storage and distribution, to cost about \$50,000 with equipment.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of motor trailers, parts, etc., has acquired plant and business of Warner Mfg. Co., Beloit, Wis., manufacturer of kindred products, and will concentrate production at Detroit. Warner company, however, will continue to operate under present name, as a subsidiary of Fruehauf organization.

Pittsburgh

PITTSBURGH, Dec. 9.—Machine tool business has been quiet so far this month and local dealers do not look forward to much buying before January. A number of the larger lists which have been out are now largely cleaned up and new inquiry is confined mostly to single units. This condition, however, is considered seasonal and it is not thought that buying has been seriously disturbed by uncertain business conditions. Replacements are numerous and local offices are being called upon to furnish many parts for existing equipment.

Railroad buying is not a factor in the market, but a number of the larger carriers have made appropriations which include heavy tool buying and formal inquiry is expected at any time. The Baltimore & Ohio has an inquiry out for some tools on which several dealers are quoting.

Orders for steel mill and other heavy equipment are still reaching local companies and expansion programs announced in the last few weeks will bring additional business. Some companies have orders on their books which will require at least six months for execution and delivery dates are still an important factor in placing business.

Center Foundry & Machine Co., Wheeling, W. Va., will make \$50,000 addition to its plant at Warwood, W. Va., which is expected to be completed by Feb. 1. New building to adjoin old plant will be 100 ft. long and will be devoted entirely to molding space. Foundation will be laid by Consolidated Engineering Co. and steel frame will be erected by Wheeling Structural Steel Co., both of Wheeling.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, is arranging an expansion program to cost about \$32,000,000, divided into fund of \$15,000,000 for extensions to plant at New Kensington, Pa., and additions to other plants devoted to fabricating of string alloys from aluminum, including new works in Tennessee; \$5,000,000 for expansion in plants given over to production of pig aluminum, and \$12,000,000 for development of hydroelectric power for works operation, particularly in Tennessee district.

Firestone Tire & Rubber Co., Akron, Ohio, has asked bids on general contract for three-story factory branch, service and distributing plant at Pittsburgh, to cost about \$225,000 with equipment. Lockwood Greene Engineers, Inc., Hanna Building, Cleveland, is architect and engineer.

State Board of Control, Capitol Building, Charleston, W. Va., James S. Lakin, president, is asking bids until Jan. 7 for new vocational training school at West Virginia State College Institute, to cost about \$125,000 with equipment.

South Atlantic

BALTIMORE, Dec. 9.—Plans are being considered by Davison Chemical Co., Garrett Building, Baltimore, for two-story addition to commercial fertilizer plant in Curtis Bay district, to cost about \$175,000 with equipment. Work will probably begin early next spring.

Leathersteel Products Corporation, John H. Mooney, Garrett Building, Baltimore, president, recently organized to take over and expand company of same name with plant at 173 Long Wharf, Boston, has leased space in local building at Lombard and Frederick Streets. Work has begun on removal of equipment from Boston to new location where production will be concentrated and additional machinery provided for increased output. John I. Peach, Baltimore, is secretary and treasurer of new organization.

Julian P. Friez Co. Division of Consolidated Instrument Corporation, Baltimore Street and Central Avenue, Baltimore, manufacturer of precision instruments, will take bids early next year for three-story addition, to cost about \$80,000 with equipment. E. H. Gidden, Jr., American Building, is architect. Headquarters of parent company are at 395 East Forty-seventh Street, New York.

Board of Glynn County Commissioners and City Council, Brunswick, Ga., are arranging for joint airport to cost about \$300,000, county and city each to defray one half of sum, to include hangars, repair and reconditioning shops, oil storage and distributing building and other units. F. J. Terras, Brunswick, engineer, has plans.

Board of Trustees, Fort Valley Industrial School for Colored, Fort Valley, Ga., has awarded contract to Aiken & Faulkner, 158 Auburn Avenue, for three-story addition to cost about \$75,000. Ludlow & Peabody, 101 Park Avenue, New York, are architects.

Virginia Public Service Co., Charlottesville, Va., is arranging for hydroelectric power plant at Blands Ford, to cost \$350,000 with transmission system. Contract for power dam has been let to L. E. Myers Co., 53 West Jackson Boulevard, Chicago.

City Council, Wilson, N. C., is planning extensions and improvements in municipal electric light and power plant, to cost about \$300,000 including additional equipment. A bond issue is being arranged.

United States Cold Storage Co., Inc., recently organized, care of A. Epstein, 2001 West Pershing Road, Chicago, engineer, has plans for multi-story cold storage and refrigerating plant at Atlanta, Ga., for which permission recently was secured to take over site now occupied by Atlanta Union Station. It will cost \$2,000,000 with machinery. Work will begin early in spring.

Hampton Roads Shipbuilding Corporation, Norfolk, Va., care of S. M. Brandt, Norfolk, attorney and representative, recently organized with capital of \$250,000 and 2500 shares of stock, no par value, plans early operation of shipbuilding and repair works in Hampton Roads district. E. E. Gann, Washington, is president.

Page County School Board, Luray, Va., is considering installation of manual

training equipment in new two-story high school to cost about \$175,000, for which superstructure will be placed under way at once. Mims, Speake & Co., Luray, are architects.

Cleveland

CLEVELAND, Dec. 9.—Single tool inquiries improved somewhat the past week and the market has a better tone. Some inquiries now coming out, however, are not expected to result in orders before January. Automobile parts manufacturers are busier, some having received large production orders from the Ford Motor Co., and are buying a little additional equipment. One inquiry is for seven turret lathes that will probably be purchased during the week. The Electric Auto-Lite Co., Toledo, is buying machine tools for its plant extensions. The press market, which has been slow the past few weeks shows improvement as manufacturers are now getting quite a few single tool inquiries.

Standard Oil Co. of Ohio, East Ohio Gas Building, Cleveland, is arranging an expansion program to cost \$2,750,000, including additions in oil refineries and oil storage and distributing plants, and installation of new equipment.

Libbey-Owens Glass Co., Toledo, Ohio, has work under way on a continuous grinding unit to cost more than \$2,500,000 with machinery. When completed, rotary grinding operations at plant will be discontinued.

Sherwin-Williams Co., Canal Road, Cleveland, manufacturer of paints, varnishes, oils, etc., is planning an expansion program representing a total investment of \$1,500,000. Work will include addition to local plant to cost \$450,000 with equipment; extensions in branch plant at Coffeyville, Kan., to cost about \$300,000 with equipment; new storage and distributing plant at Chicago, and additions and improvements in plant at Newark, N. J., to cost \$520,000; remainder of fund will be used for expansion in other parts of country.

Ice & Fuel Co., 1421 West Federal Street, Youngstown, will take bids in January for two-story ice-manufacturing plant to cost about \$170,000 with machinery. George B. Bright, 2615 Twelfth Street, Detroit, is architect and engineer.

Pennsylvania-Ohio Power & Light Co., 25 East Boardman Street, Youngstown, is arranging for extensions and improvements in plants and system in eastern Ohio and western Pennsylvania, totaling \$3,750,000 with equipment. C. S. McCalla is vice-president and general manager.

Indiana

INDIANAPOLIS, Dec. 9.—Fort Wayne Rolling Mills Corporation, 1701 McKinley Street, Fort Wayne, has plans for a one-story unit, 60 x 250 ft., to cost about \$100,000 with equipment. Abel-Howe Co., 53 West Jackson Boulevard, Chicago, is engineer.

Josam Mfg. Co., Second and Canal Streets, Michigan City, manufacturer of iron pipe drains, unions, etc., will soon take bids on general contract for a one-story addition. Ahlgrim & Boonstra, Warren Building, are architects.

Packard Fort Wayne Co., 415 West Creighton Avenue, Fort Wayne, local

representative for Packard automobile, has plans for one-story service, repair and sales building, to cost about \$100,000 with equipment. Pohlmeier & Pohlmeier, Central Building, are architects.

In connection with expansion program to cost about \$3,500,000, previously announced, Auburn Automobile Co., Auburn, will make extensions in plant of Limousine Body Co., Kalamazoo, Mich., a subsidiary, to cost over \$100,000 with equipment.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has superstructure under way on one and two-story and basement plant, to cost about \$200,000 with machinery. Work is also in progress on one-story storage and distributing plant, 160 x 160 ft., on adjoining site, to cost about \$65,000. Charles E. Bacon, Odd Fellows Building, is architect.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Shelby Construction Co., Shelbyville, for one-story factory branch, service and distributing plant at Kokomo, to cost about \$100,000 with equipment. Bishop, Knowlton & Carson, 3112 North Meridian Street, Indianapolis, are architects.

Service Products Corporation, 201 South Rural Street, Indianapolis, manufacturer of fans, sheet metal stampings, etc., has awarded general contract to Charles J. Wacker, 3223 Central Avenue, for one-story addition, 132 x 150 ft., to cost about \$65,000 with equipment.

Anaconda Wire & Cable Co., Anderson, Ind., has started work on an addition, 90 x 200 ft.

St. Louis

ST. LOUIS, Dec. 9.—Johnston Tin Foll & Metal Co., 6106 South Broadway, St. Louis, will soon take bids on general contract for two-story addition, to cost about \$45,000 with equipment. C. F. Deitering, Central National Bank Building, is architect. W. H. McIntyre is head of company, in charge.

Koken Companies, Inc., 3400 Morganford Road, St. Louis, manufacturer of enameled iron barber chairs and kindred products, has awarded general contract to William H. & Nelson Cunliff Co., 3327 Lindell Boulevard, for one-story addition, 80 x 100 ft., to cost \$40,000 with equipment.

City Council, Ponca City, Okla., has plans for hangar, 125 x 210 ft., with repair and reconditioning facilities, at municipal airport, to cost over \$65,000 with equipment. Part of unit will be used for administration service. E. O. Bennett, 1127 South Seventh Street, is engineer.

Missouri Natural Gas Co., 1107 Olive Street, St. Louis, is planning construction of pipe line from Poplar Bluff, Mo., to connection with trunk line of Mississippi River Fuel Corporation, to cost over \$300,000 with booster stations and auxiliary equipment. J. A. Milner is construction engineer for company.

Protective Metals Co., Sand Springs, Okla., is considering plans for new one-story sheet metal plant, to cost over \$80,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, is considering a new local engine terminal and repair shops near Nicholson and Topping Avenues, to cost about \$600,000 with equipment. Appropriation will be arranged in 1930 budget. E. A. Hadley, address noted, is chief engineer.

Cities Service Oil Co., Tulsa, Okla., has awarded general contract to Hercules Construction Co., Wainwright Building, St. Louis, for one-story storage and distributing plant at 4226 Chippewa Street, St. Louis, to cost about \$45,000 with equipment.

State Board of Administration, State House, Topeka, Kan., Harry Rhodes, business manager, plans call for bids on general contract early in January for two-story and basement industrial building at State School for Deaf, Olathe, 50 x 100 ft., to cost about \$40,000 with equipment. Charles D. Cuthbert, State House, is architect.

Oklahoma Sash & Door Co., East Grand Street, Oklahoma City, Okla., is considering erection of new two-story millwork factory, to cost over \$100,000 with equipment. Tools will be electrically operated.

In connection with an expansion program to cost \$10,811,000, St. Louis-San Francisco Railway Co., plans new yards and shops at Springfield, Mo., to cost \$1,856,000 with equipment.

Great Western Cold Storage Co., Oklahoma City, Okla., has leased building to be erected at Reno Street and Webb Avenue, four stories, 130 x 200 ft., for new cold storage and refrigerating plant, to cost \$325,000 with machinery. John J. Harden, Petroleum Building, in charge.

Chicago

CHICAGO, Dec. 9.—Most promising among new developments in this market is a list for about \$250,000 worth of machine tools soon to be issued by the Illinois Steel Co. Another industrial list expected at an early date is one from the Allis-Chalmers Mfg. Co. for its tractor plant additions at Milwaukee, and Springfield, Ill. Railroads are slow in making purchases against recent requests for prices on individual items. However, sellers judging by figures requested for budgeting purposes, anticipate a substantial volume of business from the railroads in 1930. It seems likely also that farm equipment manufacturers will buy needed machine tools in larger quantities. Sales the past week were widely scattered and in about the same volume as in late November.

Chicago, North Shore & Milwaukee has plans for car and electric locomotive shops at Waukegan, Ill., to cost \$1,000,000. General coach and freight car yards will also be established.

Albertson & Co., Sioux City, Iowa, manufacturers of electric drills and bench grinders, are planning expansion which will increase production 50 to 100 per cent.

Dallas Brass & Copper Co., 6600 West Grand Avenue, Chicago, is planning two one-story additions, to cost about \$900,000 with equipment. Company is completing several new units, including engineering building and machine shop, 112 x 161 ft.; addition to brass rolling mill, 125 x 239 ft.; and wood-working shop, 62 x 160 ft. C. D. Dallas is president.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has plans for two and three-story automatic power substation, to cost about \$100,000 with equipment, and another substation to cost about \$50,000. Company engineering department is in charge.

Mid-West Canning Corporation, De Kalb, Ill., is considering new multi-story plant at Genoa, Ill., to cost about \$300,000

with machinery. Company is now operating a branch factory at Rochelle, Ill.

Iowa Public Service Co., Fort Dodge, Iowa, is contemplating power plant at Audubon, Iowa, using Diesel oil-burning engine unit, to cost about \$100,000 with equipment.

Board of Education, Le Sueur, Minn., is considering installation of manual training equipment in new two-story and basement high school to cost \$150,000, for which plans will be drawn by George Pass & Son, Eckle Building, Mankato, Minn., architects.

Holly Sugar Corporation, Colorado Springs, Colo., is considering rebuilding storage and distributing plant at Torrington, Wyo., recently destroyed by fire with estimated loss over \$450,000, exclusive of stock.

Minneapolis Threshing Machine Co., Hopkins, Minn., is contemplating a one-story factory branch and distributing plant at Grand Forks, N. D., to cost about \$30,000 with equipment.

Viking Pump Co., Cedar Falls, Iowa, plans immediate erection of a two-story addition, 52 x 152 ft.

Electrical Coal Mining Machinery Co., 309 St. John's Court, Chicago, has secured a site at Danville, Ill., and contemplates erection of a new plant and removal to new location. Company is planning to add to its line of products.

Cincinnati

CINCINNATI, Dec. 9.—While demand for planers and other heavy types of machine tools is lagging somewhat, improvement in orders for lathes and lighter tools are noted. In fact, fresh bookings the past week were much greater than in the preceding two or three weeks. Production in all lines continues at a high rate and no change, at least for the remainder of this year, is anticipated.

The Russian Government has placed an order with a local manufacturer for ten standard lathes of various sizes and a New York company purchased three large lathes.

Bids will be received until Dec. 20 by Board of County Commissioners, Court House, Cincinnati, for automobile service, repair and garage building, and additions to power house and mechanical laundry at County institution, to cost more than \$90,000 with equipment. Samuel Hannaford & Sons, Dixie Terminal Building, are architects.

Fyr-Fyter Co., 221 Crane Street, Dayton, Ohio, manufacturer of fire extinguishers, is considering erection of three-story addition, to cost over \$85,000 with machinery.

Board of Education, Waverly, Ohio, is considering installation of manual training equipment in new high school to cost about \$150,000, for which plans will be drawn by DeVoss & Donaldson, Hollywood Theater Building, Portsmouth, Ohio, architects.

Louisville Gas & Electric Co., Louisville, is arranging an expansion and improvement program to cost \$4,950,000, including transmission lines, distributing systems and other work.

Manchester Lime Co., Manchester, Tenn., has plans for two-story storage and distributing plant to cost about \$40,000 with mechanical-handling and other equipment. P. A. Stiver is one of heads of company in charge.

Kurz-Kasch Co., South Broadway, Dayton, Ohio, operating a plastic molding works, has awarded general contract to J. C. Gohn, Callahan Bank Building, for one-story addition, 90 x 120 ft., including improvements in present factory, to cost about \$50,000 with equipment.

Kentucky Utilities Co., Louisville, operating electric light and power properties, will increase capital from \$30,000,000 to \$35,000,000, about \$2,000,000 of fund to be used for extensions and improvements in generating and distributing plants and system.

Board of Education, Philo, Ohio, is considering installation of manual training equipment in new two-story and basement high school to cost about \$300,000, for which plans will be prepared by Richards, McCarty & Bulford, 584 East Board Street, Columbus, Ohio, architects. Bids on general contract will be asked in about 60 days.

Standard Oil Co. of Kentucky, Inc., West Bloom Street, Louisville, is planning extensions and improvements in oil storage and distributing plant in Riverside section, Savannah, Ga., to cost \$100,000 including equipment.

Cincinnati-Bickford Tool Co., 3148 Forrer Street, Cincinnati, has awarded general contract to Edwards Mfg. Co., Fifth and Culvert Streets, for one-story addition.

Milwaukee

MILWAUKEE, Dec. 9.—Inquiry and orders for machine tools in this territory show substantial increases and business is reported a little better than normal for the season. The automotive industry is gradually increasing production, and many manufacturers of parts and accessories, especially for trucks and tractors, are well booked for this time of year. Some expansion programs, involving construction of new plants, are scheduled to start in March, but machinery needs are not yet available.

Allis-Chalmers Mfg Co, Milwaukee, has received bids for a one-story addition, 200 x 350 ft., for its Monarch tractor division, at Springfield, Ill., with crane runway and railroad siding. Klug & Smith, engineers, Mack Block, Milwaukee, are in charge.

Wrought Washer Mfg Co, Milwaukee, has moved its subsidiary, Universal Tool & Die Co., into new two-story building at Barclay and Washington Streets, costing \$85,000 with new equipment, and will invest \$500,000 in rebuilding plant formerly occupied by Beaver Mfg Co., Chase and Oklahoma Avenues, for rerolling mill, raw material storage and shipping facilities.

School District No. 1, White Fish Bay, Milwaukee post office, has appointed M. Tuilgren & Sons Co., architect, 20 Prospect Avenue, Milwaukee, to draw plans for new high school, 250 x 520 ft., costing \$1,000,000, to include two manual training shops. H. S. Rogers, 230 Birch Avenue, White Fish Bay, is director.

Board of Vocational Education, Racine, Wis., has plans by Frank J. Hoffman, architect, James Block, for first unit of new vocational training school, three stories, 68 x 128 ft., to cost about \$400,000 with equipment. T. S. Ress, Third Street and Lake Avenue, is director.

Board of Education, South Milwaukee, will rebuild vocational training school destroyed by fire Dec. 2. Site has not been

selected. H. Daehling is secretary of board.

Board of County Supervisors, Waukesha, Wis., has appropriated \$38,000 for erection and equipment of a new light and power plant at County asylum. William Koheler is County clerk.

Gillette Rubber Co., Eau Claire, Wis., has begun construction of a one-story addition, 56 x 146 ft., to its machine shop. Hoepfner-Bartlett Co., 414 East Grand Avenue, is general contractor.

Layne-Northwest Co., 1023 Wells Street, Milwaukee, has been organized to handle northwestern business of Layne & Bowler, Memphis, Tenn., manufacturer of turbine pumps and other deep-well equipment.

Gulf States

BIRMINGHAM, Dec. 9.—Black Diamond Coal Co., Birmingham, has authorized immediate installation of new mechanical washery at coal mines at Whitwell, Tenn., recently acquired, to cost about \$45,000 with equipment.

American Service Co., 705 Walnut Street, Monroe, La., has plans for new ice-manufacturing plant at West Monroe, 100 x 125 ft., to cost about \$100,000 with machinery.

Cage Hardware & Implement Co., Chaparral Street, Corpus Christi, Tex., has awarded general contract to T. A. Applewhite, Corpus Christi, for one-story storage and distributing plant, 100 x 140 ft., to cost about \$30,000 with equipment. T. W. Crow, Corpus Christi, is architect.

Southwestern Gas & Electric Co., Shreveport, La., is arranging an expansion program to cost about \$4,000,000, including additions in generating and transmission facilities in Texas, Louisiana, Mississippi and Arkansas.

Swift & Co., Union Stock Yards, Chicago, have begun superstructure for a one-story plant at Birmingham, on site, 125 x 200 ft., to cost more than \$75,000 with equipment.

Rio Grande Oil Co., 225 East Seventh Street, El Paso, Tex., is considering a new refinery, with capacity of about 3000 bbl. per day, to cost over \$750,000 with machinery. A large part of plant will be devoted to production of lubricating oils.

City Council, Tampa, Fla., is contemplating construction of hangars, repair shops, oil storage and other field units for new municipal airport, for which a bond issue of \$750,000 has been approved. City engineering department is in charge.

Southern Natural Gas Co., First National Bank Building, Birmingham, is arranging for expansion to cost about \$7,700,000, large part of fund to be used for pipe line construction in Alabama, Georgia and other States, with new compressor stations and auxiliary structures.

East Coast Refrigeration Co., Lake Worth, Fla., has plans for new two-story refrigerating and precooling plant, 65 x 120 ft., primarily for railroad car service, to cost about \$85,000 with equipment. Daniel C. Smith is secretary.

Marion County Power Co. of Florida, recently organized, care of Scott B. Appleby, Jr., 2501 Thirtieth Street, N. W., Washington, has engaged Emmett S. Killebrew, Cordele, Ga., consulting engineer, to prepare plans for hydroelectric power project on Ocklawaha River, Florida, to cost more than \$850,000 with transmission system.

Board of Education, El Paso, Tex., is considering installation of manual train-

ing equipment in new two-story and basement high school to cost about \$285,000, for which bids are being asked on general contract until Dec. 17. Guy L. Fraser, Martin Building, and Braunton & McGhee, First National Bank Building, are associated architects.

Martin J. Insull, president of Middle West Utilities Co., 72 West Adams Street, Chicago, and associates have acquired controlling interest in Pecos Valley Power & Light Co., operating at Girvin, Tex., and in oilfield districts in western part of State. Company will be consolidated as unit of Middle West Utilities Co. and expansion carried out, including transmission lines.

Wichita Falls Motor Co., 802 Louisiana Street, Houston, Tex., manufacturer of motor trucks, with plant at Wichita Falls, Tex., has acquired building at Lamar and Chenevert Streets, Houston, for factory branch, service and sales building. Repair and parts division will be installed.

Pacific Coast

SAN FRANCISCO, Dec. 5.—Pacific Electric Mfg. Co., 5815 Third Street, San Francisco, manufacturer of electrical specialties, has asked bids on general contract for one-story addition, to cost \$50,000 with equipment. R. E. McLane, address noted, is company engineer.

Board of Education, Seattle, plans installation of manual training equipment in one and three-story James Monroe junior high school to cost \$600,000, for which bids are being asked on general contract until Dec. 18. F. A. Naramore, Central Building, is architect.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for new steam-operated electric generating plant near Modesto, to cost about \$200,000 with equipment. This will be first of three such stations to be constructed in this vicinity. Company engineering department is in charge.

Hood River Canning Co., Hood River, Ore., has asked bids on general contract for new two-story and basement plant, 100 x 100 ft., in St. Johns industrial district, Portland, where operations will be transferred following recent fire loss at Hood River. New plant will include a cold storage and refrigerating unit, and will cost about \$75,000 with equipment. Richard Sundeleaf, Guaranty Building, Portland, is architect.

Crown Zellerbach Corporation, San Francisco, has begun expansion at pulp and paper mill of Crown Willamette Paper Co., Camas, Wash., a subsidiary, to cost over \$500,000.

New Trade Publications

Arc Welding of Pipe Lines.—Lincoln Electric Co., Cleveland. 12-page folder describing methods of welding, inspection, and test found satisfactory on 17 lines totaling 2491 miles.

Roebbing Welding Wire.—John A. Roebbing's Sons Co., Trenton, N. J. Broadside illustrating notable construction work fabricated by use of this product.

Wire Cloth and Wire Screens.—Ludlow-Saylor Wire Co., St. Louis. A 36-page booklet gives complete reference data on double-crimped wire cloth and woven wire screens. Illustrations show filter presses, revolving screens, sifters, vibrating screens, driers, strainers, pulverizers and grinding mills, the

Readymix Concrete Co., 575 Berry Street, San Francisco, has revised plans for new plant, to cost \$100,000 with equipment. L. H. Nishkian, 525 Market Street, is engineer.

Puritan Ice Co., Lompoc, Cal., plans one-story ice-manufacturing plant, to cost \$90,000 with machinery.

Victor Talking Machine Co., North Sycamore Avenue, Los Angeles, subsidiary of Radio Corporation of America, Inc., New York, has filed plans for one-story addition, 90 x 160 ft., to cost about \$80,000 with equipment.

Board of Education, Santa Barbara, Cal., has plans for a one-story manual training shop, to cost about \$25,000 with equipment. Soule, Murphy & Hastings, 116 East Sola Street, are architects.

Foreign

PLANs have been approved by Phillips Glow Lamp Co., Amsterdam, Holland, for increase in capital from 100,000,000 to 250,000,000 guilders (about \$40,000,000 to \$100,000,000) part of proceeds to be used for plant expansion and for purchase of other companies in same line.

Secretary, Port and Telegraph Department, Wellington, New Zealand, is asking bids until Jan. 21 for 40 precision tension gages for measuring contact pressure of relay springs, etc., complete with sector-shaped scale.

General Electric Co., Schenectady, N. Y., is considering immediate erection of new plant at Monterey, Mexico, for manufacture of incandescent lamps, to cost about \$400,000 with equipment.

A company at Verona, Italy, has plans for a new cold storage and refrigerating plant, including precooling facilities for freight car service, to cost about \$260,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Italy No. 97352.

Barry, Ostlere & Shepherd, Kirkcaldy, Scotland, manufacturers of linoleum, have acquired 20-acre tract at Farnham, Que., as site for Canadian branch plant, with steam power plant, machine shop and auxiliary mechanical structures, to cost over \$1,500,000 with machinery.

Officials of Julius Kayser & Co., 353 Fourth Avenue, New York, have organized Julius Kayser & Co., Ltd., of Australia, a subsidiary, to construct and operate a textile mill at Melbourne, Australia, to cost over \$350,000 with machinery. Australian Knitting Mills, Melbourne, are interested in enterprise.

operation and output of which are controlled with wire cloth and woven wire screens. There are 50 or more extra-heavy screens which have the wire diameter actually larger than the nominal opening between wires.

Fire Brick.—Laclede-Christy Clay Products Co., St. Louis. A four-page folder, issued in the form of a Thanksgiving proclamation, sets forth testimonials by various users of this company's fire brick.

Motor Controller.—Monitor Controller Co., Baltimore, Md. Bulletin 115 of eight pages illustrates and describes an automatic magnetic-reversing, dynamic braking controller for d. c. motors. Approximate weight is from 240

to 275 lb. and average rating 5 hp. or under to 15 hp.

Arc-Welding Sets.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing constant-potential arc-welding sets, suitable for furnishing power to a number of welding stations and for operating automatic-welding equipment. Standard sizes are 400, 500, 750, 1000 and 1500 amperes at 60 volts.

Chamfering Machine.—City Machine & Tool Works, Dayton, Ohio. Four-page folder illustrating and describing new air-equipped Peerless tooth chamfering machine. Base area is 26 in. x 36 in.; spindle speed, 1600 r.p.m.; net weight, 1800 lb.

Metal Paint Primer.—Liquid Metal Products, Inc., 231 South La Salle Street, Chicago. Sixteen-page illustrated pamphlet, outlining uses of Stibloy, a metal compound in liquid form, developed to extend the life of galvanized surfaces. The compound is described as a primer which holds paint, enamel and lacquer tenaciously, permitting the immediate painting of new galvanized steel.

Steel Products.—United States Steel Corporation, 71 Broadway, New York. Fifty-two page book, listing the corporation's subsidiaries, their offices, products and publications.

Spot-Welding Electrodes.—Fansteel Products Co., North Chicago, Ill. Folder describing "Truxelt," a material for electrodes made of copper hardened with tungsten, said to be tough, heat resistant and strong at high temperatures.

Recording Pyrometer.—Wilson-Maeulen Co., Inc., 333 Concord Avenue, New York. Catalog of 8 pages, illustrating and describing potentiometer recording pyrometer for temperature measurement with great width of chart, which permits very close reading. Scale ranges available reach maxima of 200 to 3000 deg. Fahr.

Continuous Centrifugal.—Elmore Centrifugal Products Corporation, 6527 Manchester Avenue, St. Louis. Four-page folder illustrating and describing continuous centrifugals with capacity up to 100 tons an hour. They are capable of deliquifying solid materials from over 20 per cent to 2½ per cent.

Heating and Ventilating.—General Iron Works Co., Cincinnati. Bulletin of 30 pages showing various installations of Hot-Kold system for heating and ventilating and humidifying control. Built in several sizes suitable for home or industrial plants, it is operated by gas.

Apparatus Insulators.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1858, describing outdoor apparatus insulators which have application for assembling switchgear apparatus, such as bus supports, disconnecting switches, etc. Complete information and test data on company's complete line are included.

Automatic Welding Head.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing an automatic welding head and control with magnetic clutch. Distinctive features are simplicity, sensitivity, thorough lubrication, uniform operation, strong construction and interchangeability.

Precision Measuring Instruments.—S. F. Bowser & Co., Inc., Fort Wayne, Ind. A folder issued by this company describes the Xacto Meter, a precision meter for measuring the amount of

liquid passing through a pipe line by positive volumetric displacement.

Sand Blast and Dust Collecting Equipment.—Pangborn Corporation, Hagerstown, Md. A folder entitled "The Quarter Century Mark" tells of the twenty-fifth anniversary of the company and shows some of the industrial companies which have installed its equipment.

Centerless Grinders.—Cincinnati Grinders, Inc., Cincinnati. A new booklet giving a full description of the No. 3 and No. 4 Cincinnati centerless grinders has been published. Many views of the machines in operation are shown. The company also has issued a bulletin featuring automatic hoppers for Cincinnati centerless grinders.

Are Welders.—Lincoln Electric Co., Cleveland. A series of specification sheets in bulletin form, describing the 300-ampere "stable-arc" welder in its various forms, driven by direct or alternating current motor or by gas engine, mounted on skids or on wheels.

Conveyor Furnace.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing a mesh-belt conveyor furnace, rated 45 kw., 220 volts, single-phase; conveyor 16 in. wide and 6 ft. long. Capacity is 300 lb. an hour at 1600 deg. Fahr.

Counterbores, Multiple-Operation and Other Tools.—Gairing Tool Co., 1629 Lafayette Boulevard, Detroit. Catalog No. 20, 124 pages, 8½ x 11 in. Describes and illustrates standard interchangeable counterbores, holders and pilots; adjustable extension holders; counterbore sets; back spot facers; offset spot-facing heads; core drills; and reamers, including nose drive type. Swing tool boring heads, multiple-operation tools of both inserted blade and solid type; form cutters, hollow mills and grinding fixtures are among other tooling shown. List prices are given in a separate section, and pages are devoted to interesting applications of standard and special tools. A section is devoted to useful information.

Bus-Bar Supports.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1825, dealing with Type H bus-bar supports for indoor use. Both standard-duty and heavy-duty supports are treated, with special details of construction, distinctive features and fittings.

Shape Cutting Machine.—General Welding & Equipment Co., Boston. Folder describing oxy-gas automatic shape cutting machine for fabrication of parts from welded structural steel and plate, and illustrating some of the applications.

Oxwelded Piping.—Linde Air Products Co., New York. 24-page booklet illustrating various applications of the welded pipe joint in industrial services and for domestic, office and factory heating systems.

Airplane Fuselage Welding.—Linde Air Products Co., New York. 8-page folder outlining an instruction course for apprentice welders on thin-walled alloy steel tubing and duralumin.

Railroad Electrification.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Publication 1857, describing electrification of Great Northern Railway. Among topics discussed are distribution system, locomotives, operation of system and maintenance of locomotives and equipment.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

CONFIDENCE has been reestablished in all major industries, President Hoover said in his annual message, and he believes that wage rates and agricultural prices will be maintained. . . Industrial leaders met with him in Washington to form a temporary organization to encourage continuity of construction and maintenance work and to remove fear of unemployment.

EXPENDITURES of the national Government next year will pass four billion dollars for the first time since 1921, the expected needs of the Federal Farm Board being responsible for much of the increase over this year, although gradually rising costs in all lines are expected by the President. . . The Treasury refunds its short time obligations at 3½ per cent; the last offering was taken at 4½ per cent a few months ago.

SURPLUS of receipts over expenditures next year, Secretary Mellon estimates, will be \$226,000,000, and he said that it "justifies a revision of our tax laws downward". . . A resolution reducing income taxes is passed by the House of Representatives. . . Philadelphians will pay a 2.71½ tax rate next year instead of 2.79.

RETAIL trade, woolen goods, and both hard and soft coal trades have benefited greatly by the continuing and widespread cold weather. . . The two leading Chicago mail-order houses report November sales 17 and 21 per cent better than a year ago. . . "A & P" stores, 15,000 in number, sold over one billion dollars worth of groceries and meats during the last 12 months; net profit on turnover was 2½ per cent.

COMMODITY prices continue their slow rise, but wholesale and jobbing trades are very slow. . . Leather prices are decreasing; tanneries in the Central States are engaging in a price war. . . Shoe buying for spring is active.

INSOLVENCIES during November were the third lowest in number of all years since 1921; gross liabilities, however, were higher than last year. . . Fox film interests passed from personal control to that of board of trustees representing firms holding \$27,000,000 of promissory notes issued for new theaters and for "talkie" installations.

PETROLEUM output again increases. American Petroleum Institute blames refineries for continuing to produce at a rate faster than gasoline can be sold. . . Sir Henry Deterding of the Royal Dutch Shell interests proposes an international understanding to prevent overproduction, but American producers do not approve his project. . . Cheap tanker rates on crude and decline in Pennsylvania production are responsible for conversion of a trunk line carrying

oil eastward into a gasoline pipe bearing refined product westward from the Atlantic seaboard. . . Standard Oil Co. is building three semi-commercial production units to perfect manufacture of gasoline from hitherto unusable asphaltic residues by a hydrogenation process.

NATURAL gas lines leading from Monroe, La., northward to St. Louis and eastward to Birmingham, commence delivery of about 150,000,000 cu. ft. daily. . . Drilling in five localities near Washington, Pa., increases the daily gas production of that region by 15,000,000 cu. ft.

FORD Motor Co. increases minimum wage to \$7 a day, and all salaried and hourly rates about 5 per cent. . . Employment gains somewhat in Detroit, as next year's models get into production. . . Total production of American cars during 1929 will reach 5,600,000 units; about 1,000,000 more than last year and considerably more than automobile executives are predicting for 1930. . . Chrysler show rooms in New York are exhibiting extensive line of radios, thus endeavoring to maintain sales organizations during slack months. . . General Motors asks the French Government to revise its appraisal policy so that imported cars will be valued for duty purposes at retail price less selling cost. Duty is 45 per cent; nevertheless about 4000 American cars are imported annually, and about 10,000 Fords are assembled in that republic.

UNIFICATION of all rail, subway and motor bus transportation in the London area under Government ownership and private operation is the aim of Premier MacDonald—a plan branded as "socialistic". . . An order imposing a 5-cent fare on the Los Angeles trolley system is nullified by the Supreme Court. . . After a 6-year trial of a basic 5-cent fare, during which time the earnings fell \$3,300,000 below a 7 per cent return, the New Jersey Public Service lines are authorized to charge a 10-cent basic fare for casual riders for an experimental period.

MARINES were dispatched to Haiti to reinforce the 700 on duty there and to help to subdue rioting. President Hoover asked for a Congressional commission to study conditions on the island and formulate recommendations for future action. . . Secretary Stimson was joined by European powers in sending notes to Russia and China calling for cessation of hostilities in Manchuria, an action resented by the Soviet Government. A mutually satisfactory armistice is reported, however. . . Construction of the remaining three of the first five cruisers of the naval program will be delayed until after the limitations conference at London, but funds are provided in the budget for completing all of them by June, 1933.